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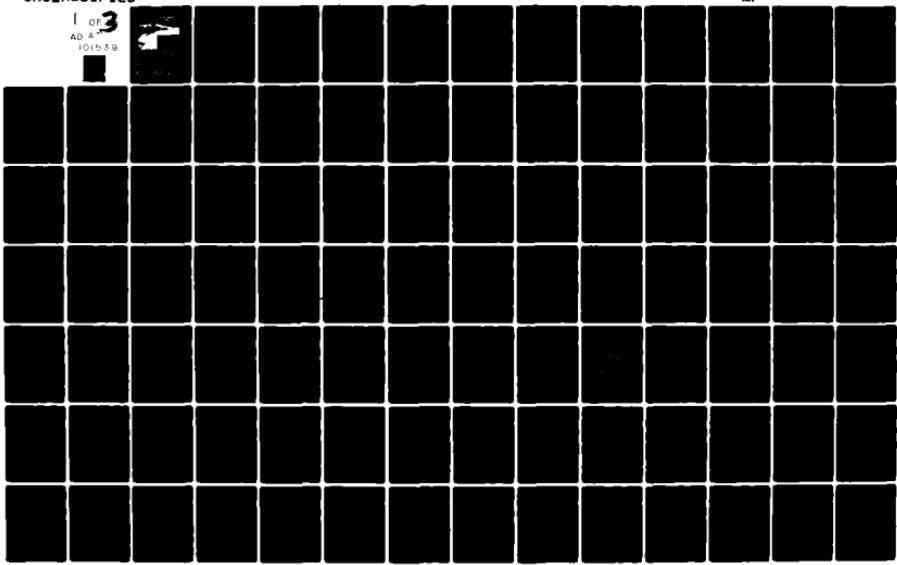
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FINAL

**ENVIRONMENTAL
STATEMENT**

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**WEST
HARBOR,
OHIO**

**recreational
navigation
improvements**



FEBRUARY 1978

(REVISED MARCH 1979)

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The purpose of this project is to provide a channel from deep water in Lake Erie into West Harbor to safely and more adequately accomodate navigation of shallow draft recreational boats. Although the harbor is currently used by small craft, shoaling at the natural channel has restricted both the number and size of vessels used in the harbor.		

STATEMENT OF FINDINGS
RECREATIONAL NAVIGATION IMPROVEMENTS AT
WEST HARBOR, OHIO

I have reviewed and evaluated, in light of the overall public interests, documents concerning the proposed action, as well as the stated views of other interested agencies and the concerned public relative to the various practical alternatives in accomplishing completion of the authorized general recreational navigation improvements at West Harbor, Ohio.

BACKGROUND

a. Authorization - The project was authorized by Section 301, P.L. 89-298, the River and Harbor Act of 27 October 1965 as described in House Document No. 245, 88th Congress, 2nd Session.

b. Problem - West Harbor is the largest and busiest recreational boat harbor in Ohio. However, the natural channel has become so shallow from sand shoals that only the very smallest recreational craft can navigate through without threat of running aground. Many boaters are forced to use a narrow exposed private channel. During storm periods, entrance through either channel is very hazardous.

c. Coordination - The development of the project resulted from correspondence with the public and with various Federal, State, and local agencies. A public hearing was conducted on 17 December 1958, to consider the advisability of improving West Harbor in the interest of small craft navigation. A public workshop was held on 17 February 1977. At this meeting, strong support was voiced by all attendees for navigational improvements. After the Draft Phase I General Design Memorandum and the Draft Environmental Statement were circulated, a public hearing was held on 21 November 1977. No objections to the plan as presented were voiced. As a result of public participation, extension of the proposed channel to serve docking facilities recently developed at the southerly limits of the harbor was incorporated into the proposed plan. Several alternatives which were suggested by citizens and agencies during the planning process were analyzed. However, due to economic, engineering, social, and/or environmental considerations, these alternatives were not acceptable.

SELECTED PLAN

The selected plan consists of two arrowhead breakwaters with an aggregate length of 2,695 feet extending northeasterly in Lake Erie on either side of the West Harbor natural channel entrance. A channel 100 feet wide and 10 feet deep would be dredged between the breakwaters to the natural harbor entrance. A channel 80 feet wide

and eight feet deep would be dredged from the entrance to the middle of the harbor and then divide into two connecting channels. Clean sand dredged from the harbor entrance would be used for beach nourishment at East Harbor State Park. Silty material dredged from within the harbor would be placed into three disposal sites. Some of the material would be tilled into two adjacent agricultural fields and the remainder would be placed into a confined site at East Harbor State Park.

ALTERNATIVES

Various alternatives have been analyzed. The possible consequences of these alternatives have been studied for environmental, social well-being, engineering feasibility, and economic effects, including regional and national economic development. These alternatives are discussed below.

a. No Action - The combination of continued shoaling and the anticipated lower water levels of Lake Erie would virtually close the natural channel to boat passage. Damage to craft attempting to use the natural channel and boat traffic congestion at the Gem Beach channel would sharply increase. During storms, boats attempting to enter West Harbor would encounter very hazardous conditions. The economy of the area would be adversely affected as the natural channel becomes unusable.

b. Harbor Island Channel. This plan is similar to the selected plan except that the channel would cut through Harbor Island instead of the natural channel. This plan was rejected because of environmental considerations.

c. Gem Beach Channel. The Gem Beach channel would be protected with breakwaters and the channel widened and deepened into West Harbor. However, one entrance into West Harbor is not considered sufficient during storm periods. The bridge at Harbor Island would also prevent entry to all but the smallest sailboats.

d. Breakwater Construction. Both rubblemound and steel sheet pile breakwaters were considered. Rubblemound breakwaters were rejected due to high costs. A combination of steel sheet piling with rubblemound riprap was selected.

e. Dredge Disposal. Alternative disposal sites considered included open-lake disposal and various sites in and around West Harbor. These sites were rejected because of environmental and/or economic reasons.

EVALUATION OF THE SELECTED PLAN

In evaluating the selected alternative, the following factors were considered pertinent:

Environmental Considerations

Dredging operations would cause turbidity and the destruction of the existing benthic community in the proposed channels. These are considered temporary impacts. The steel sheet pile breakwaters would cover approximately 1.6 acres of lake bottomland and would destroy or displace the bottom-dwelling aquatic organisms. However, the breakwaters which are reenforced with rubblemound would create a new rock-faced aquatic habitat. Dredged sandy material would be used to help restore and stabilize the nearby beach. Dredged silty material would be placed on 36 acres of former fill, smothering the existing herbaceous plant community. Vegetation however, would quickly return. Silty dredge material would also be placed on agricultural land enriching the soil for future crops.

Social Well-Being Considerations

The social benefits of the project would accrue primarily from the improved boating facilities and safer operating conditions. The public beach at East Harbor State Park would be directly benefited by beach nourishment.

Engineering Considerations

The selected plan was chosen after considering the environmental, social, and economic factors, as well as the engineering requirements. Engineering considerations have included the design of the harbor entrance, littoral transport, location of dredged material disposal sites, and economic and recreational considerations.

Economic Considerations

The estimated total first cost of the project is \$6,006,000. The estimated average annual costs are \$290,000, while the average annual benefits are \$1,206,000. The benefit-cost ratio is 4.16 to 1.00.

CONCLUSIONS

I find that the selected plan is based on thorough analysis and evaluation of various practical alternative courses of action to improve the recreational navigation needs of West Harbor, Ohio.

Accordingly, it is my decision that the total public interest would be served by the implementation of the recommended plan.

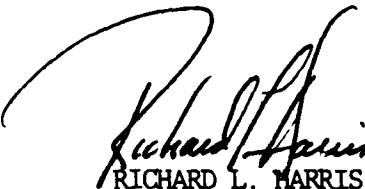
Daniel D. Ludwig
DANIEL D. LUDWIG
Colonel, Corps of Engineers
District Engineer

30 April 1979
DATE

STATEMENT OF FINDINGS
RECREATIONAL NAVIGATION IMPROVEMENTS AT
WEST HARBOR, OHIO

I concur with the preceding Statement of Findings.

1 June 1979
Date


Richard L. Harris
Major General, USA
Division Engineer

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SUMMARY

FINAL ENVIRONMENTAL STATEMENT
WEST HARBOR, OHIO
RECREATIONAL NAVIGATION IMPROVEMENTS

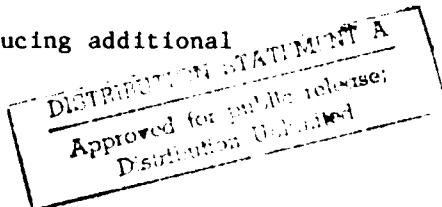
() DRAFT ENVIRONMENTAL STATEMENT (X) FINAL ENVIRONMENTAL STATEMENT

RESPONSIBLE OFFICE: U.S. ENGINEER DISTRICT, BUFFALO
1776 Niagara Street
Buffalo, New York 14207
Telephone (716) 876-5454

1. NAME OF ACTION: (X) ADMINISTRATIVE () LEGISLATIVE

2. DESCRIPTION OF ACTION: The proposed plan entails recreational navigation improvements for small craft at West Harbor, Ohio, consisting of breakwater construction and channel dredging. Breakwater construction would occur in Lake Erie at the mouth of the natural channel entrance to the harbor. Dredging would be performed to provide a deepened channel for recreational craft extending from offshore in Lake Erie through the natural channel and into the harbor.

3a. ENVIRONMENTAL IMPACTS: The proposed improvements would enhance safety conditions and increase accessibility to the harbor for resident boaters and transient craft. The use of West Harbor for refuge from severe weather on Lake Erie would also be improved. The improvements would enhance the economic base of the community and provide benefits to the regional economy by inducing additional recreational development.



b. ADVERSE ENVIRONMENTAL EFFECTS: Dredging and construction operations associated with the project would temporarily degrade the aquatic environment. Some benthic organisms would be lost. There would be temporary increases in noise and boat traffic during construction.

4. ALTERNATIVES TO THE PROPOSED ACTION:

Alternative 1 - No Action

Alternative 3 - Harbor Island Channel Plan

Alternative 4 - Gem Beach Channel Plan

Alternative Breakwater Configurations

Dredged Material Confinement Alternatives

5. COMMENTS RECEIVED:

Advisory Council on Historic Preservation

Federal Power Commission

U. S. Coast Guard

U. S. Department of the Interior

U. S. Environmental Protection Agency

U. S. Department of Commerce-National Oceanic and Atmospheric Administration

Ohio Department of Natural Resources

Lake Erie Advisory Committee

6. DRAFT STATEMENT TO CEQ 31 August 1977.

7. FINAL STATEMENT TO U. S. EPA 5 June 1979.

FINAL

ENVIRONMENTAL STATEMENT
WEST HARBOR, OHIO
RECREATIONAL NAVIGATION IMPROVEMENTS

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SECTION I
PROJECT DESCRIPTION

Authorization

1.01 A comprehensive report on the south shore of Lake Erie was authorized by Section 6 of the Rivers and Harbors Act approved 2 March 1945. A favorable interim report for improvement of West Harbor was subsequently prepared and submitted to the House of Representatives of the United States on 16 March 1964. The project as authorized is described in House Document No. 245, 88th Congress, 2nd Session. Federal improvement was authorized by Section 301, PL89-298 of the Rivers and Harbors Act of 27 October 1965 in accordance with the recommendations contained in the House Document.

1.02 This Environmental Impact Statement is a companion document to the Phase I General Design Memorandum.

Purpose

1.03 The purpose of this project is to provide a channel from deep water in Lake Erie into West Harbor to safely and more adequately accommodate navigation of shallow draft recreational boats. Although the harbor is currently used by small craft, shoaling at the natural channel has restricted both the number and size of vessels used in the harbor.

History of the Project

1.04 An interim report on the proposed improvements prepared 14 September 1962 was favorable. Federal improvement was authorized in accordance with House Document 245, dated 16 March 1964, and the recommended plan is currently being re-examined.

Recommended Plan

1.05 According to the recommended plan (see Figure 1), improvements at West Harbor consist of:

Construction of two breakwaters of arrowhead configuration having an aggregate length of approximately 2,695 feet, extending north-easterly in Lake Erie on either side of the natural entrance. The

south breakwater would connect to the shoreline.

Dredging of an entrance channel about 1,800 feet long, 10 feet deep and 100 feet wide from between the breakwaters to the mouth of the natural harbor entrance; and

Dredging of an access channel eight feet deep and 80 feet wide from the mouth of the entrance along the natural channel to a junction near the center of the harbor (about 4,060 feet), where the channel divides into a "Y" with one arm extending northerly about 2,820 feet and one southerly about 4,050 feet.

Dredging operations would commence in October 1980 and be completed by November 1981. Dredged material removed from the lake channel and the entrance channel would be used to nourish publicly owned beaches located southerly from the entrance channel at East Harbor State Park. Dredged material from the inner harbor would be placed on farm land located near the southern end of West Harbor. Two sites, 42 acres and 55 acres in size would be temporarily enclosed by earthen dikes, filled, dewatered, tilled into the soil and returned to farm usage. The northern most sites would be filled to a depth of 2 feet in each of the first and second years of the dredging process. The southern most, would also be filled to a depth of 2 feet but would only be utilized the first year of the dredging operation. A third site, 36 acres in size, would be located at East Harbor State Park on land previously used for disposal of dredged material. An earthen dike would be constructed and filled to a depth of 2 feet during the first year of dredging. No additional material from the initial channel dredging would be placed here. However, the site would be used for disposal of maintenance dredging. Maintenance dredging is estimated to be performed in operations lasting 2-3 months at 5 year intervals.

Project Benefits and Costs

1.06 West Harbor would be improved by this project's providing increased recreational opportunities for boaters and a harbor of refuge for small recreational craft. The annual benefits would be \$1,206,000. These benefits were derived by estimating the annual return owners of pleasure craft would receive as a result of the improvement as if their boats were used for hire. Estimates were made of the number of boats which will use the harbor in the future including boats expected from natural growth, those attracted because of the improvements and transient craft.

1.07 Annual costs are estimated to be \$290,000. This is based on an initial investment of \$6,006,000, a 50-year project life, an interest rate of 3½ percent, and annual maintenance costs. The benefit cost ratio is 4.16 to 1.00.

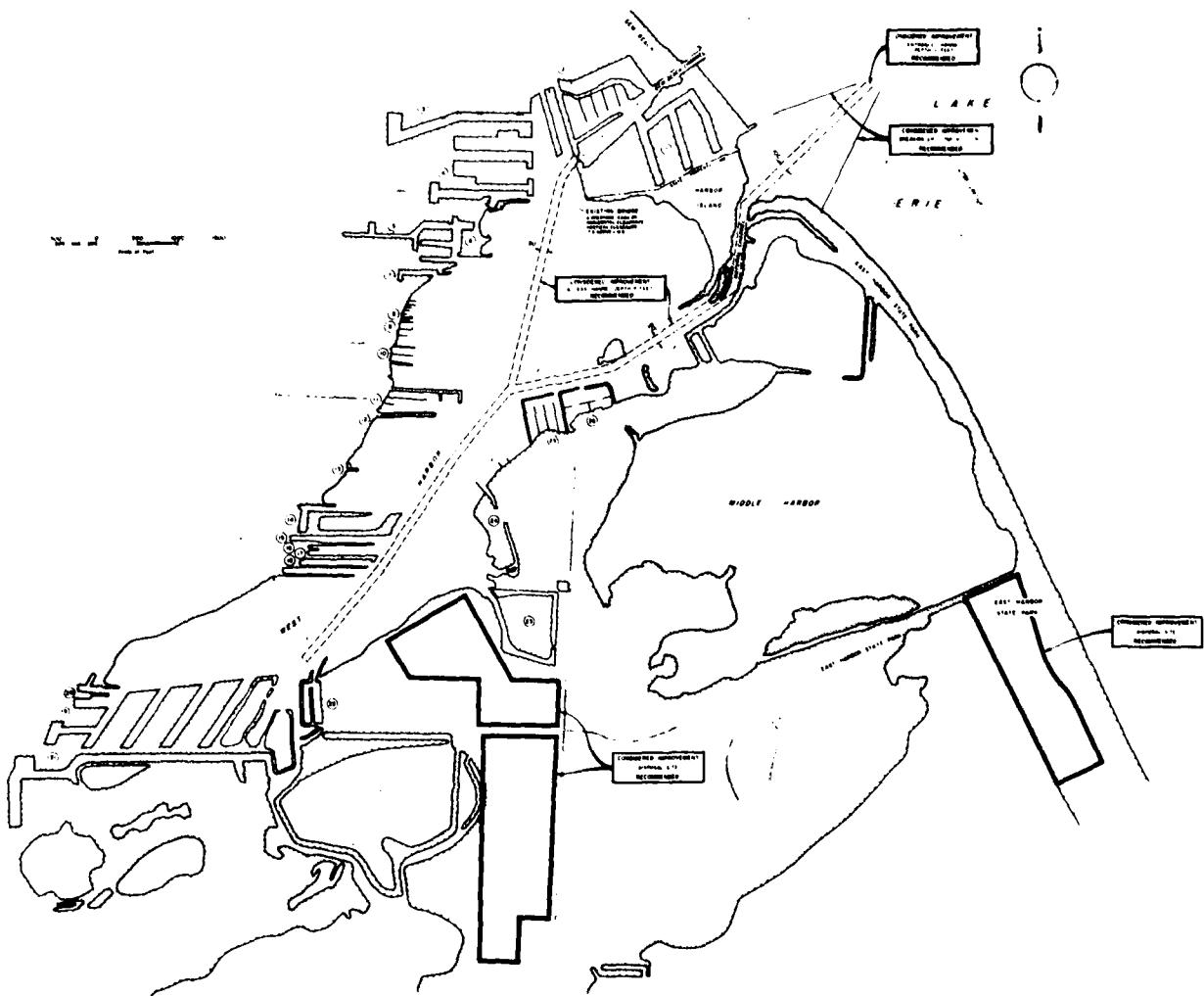


FIGURE 1 - RECOMMENDED PLAN

1.08 The annual federal costs would be \$158,000 and the annual non-federal costs would be \$132,000. See Appendix D for a summary of economic data. A more detailed discussion of the economic data is contained in the Phase I General Design Memorandum.

Non-Federal Cooperation

1.09 The State of Ohio will share the non-federal costs of the project. The items of local cooperation for the proposed project are contained in the "Proposed Local Cooperation" section of the Phase I General Design Memorandum.

Project Schedule

1.10 A proposed schedule for carrying out the necessary Phase II General Design Memorandum (G.D.M.) and further project phases is shown in Table 1. The time frame shown is predicated on the basis that Congress continues funding. Adequate coordination with all concerned interests is continually maintained to resolve conflicts which may arise so that plans can be developed within the scheduled framework which satisfies current needs and development objectives of the West Harbor region. The Ohio Department of Natural Resources, local interests and their elected legislators have expressed a strong desire to expedite the project.

TABLE 1
STUDY SCHEDULE TABLE

<u>Event</u>	<u>Schedule</u>
Submission of Final Phase I GDM and EIS	Feb 78
NCD Approval of Phase I GDM	Mar 79
General Design Conference	Apr 78
Submit Phase II GDM	Dec 78
Approval of Phase II GDM	Apr 79
Submit Plans and Specifications	Sep 79
Approval of Plans and Specifications	Oct 79

SECTION 2
ENVIRONMENTAL SETTING WITHOUT THE PROJECT

General Setting

2.01 West Harbor is located in the "islands area" of southwestern Lake Erie, which includes the Marblehead Peninsula, the Bass Islands and Kelleys Island. It is the most westerly of three prominent lagoons located along the Lake Erie side of the Marblehead Peninsula. The harbor is located in Ottawa County about eight miles northeast of Port Clinton and about ten miles northwest of Sandusky (Figure 2).

2.02 Between the Catawba Island Peninsula and the easterly end of the Marblehead Peninsula are three lagoons separated from Lake Erie by narrow barrier beaches. These lagoons, lying adjacent to one another, are West Harbor, Middle Harbor, and East Harbor (Figure 3). They are separated by narrow strips of land and are not interconnected. Middle Harbor is the shallowest and the only one of the lagoons that is not accessible from Lake Erie. It remains essentially in its natural state.

2.03 Many of the transient craft that visit West Harbor originate at harbors located within 50 miles of West Harbor, a distance that can be easily sailed during one day. The largest centers of recreational boating activity within this region of Lake Erie are the Toledo and Cleveland, Ohio metropolitan areas. Other transient recreational craft originate at harbors beyond the 50-mile distance, primarily from the metropolitan areas of Detroit, Michigan and Buffalo, New York.

General History of the Area

2.04 The project area falls within the land originally claimed by Connecticut called the Western Reserve. In 1792 Connecticut granted the western one-half million acres of the reserve to citizens whose property had been burned by the British in the war for independence. These lands were termed "The Firelands" and consisted of today's

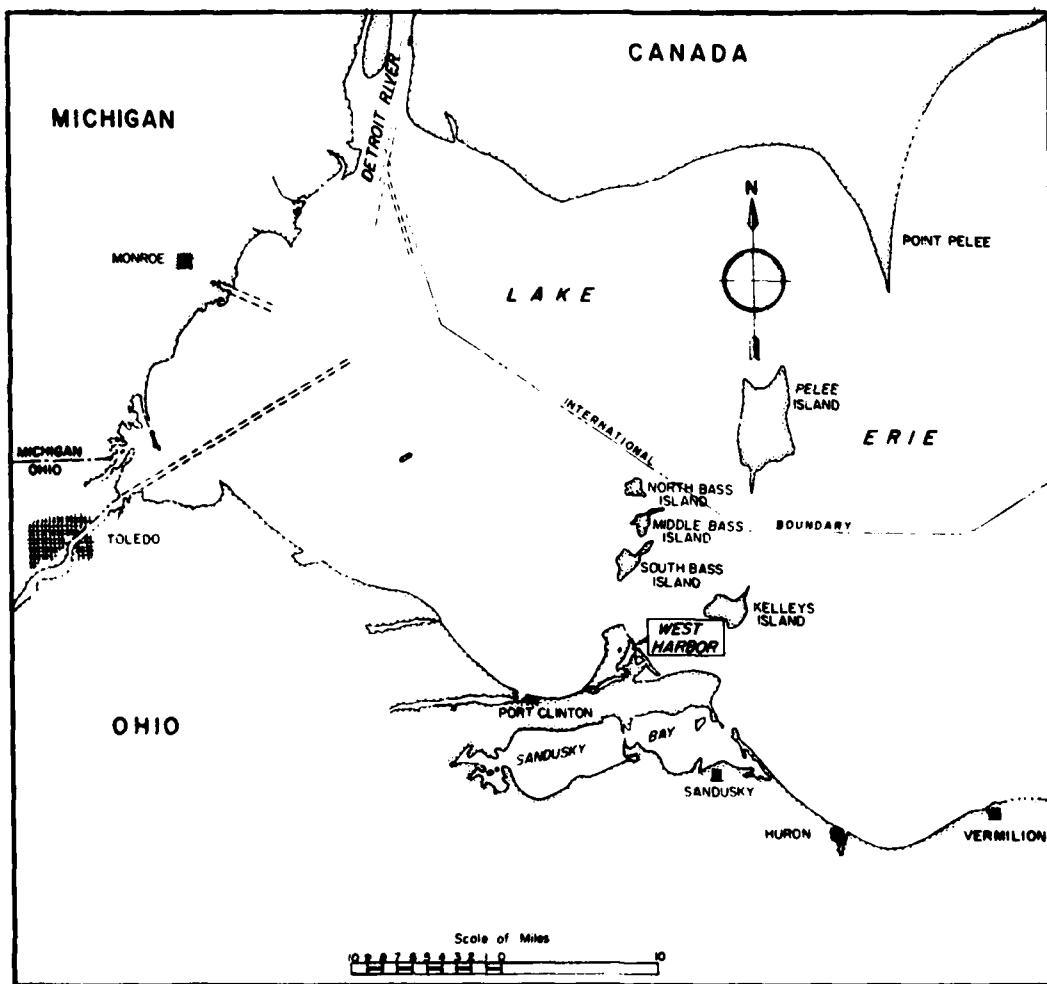


FIGURE 2 - LOCATION MAP

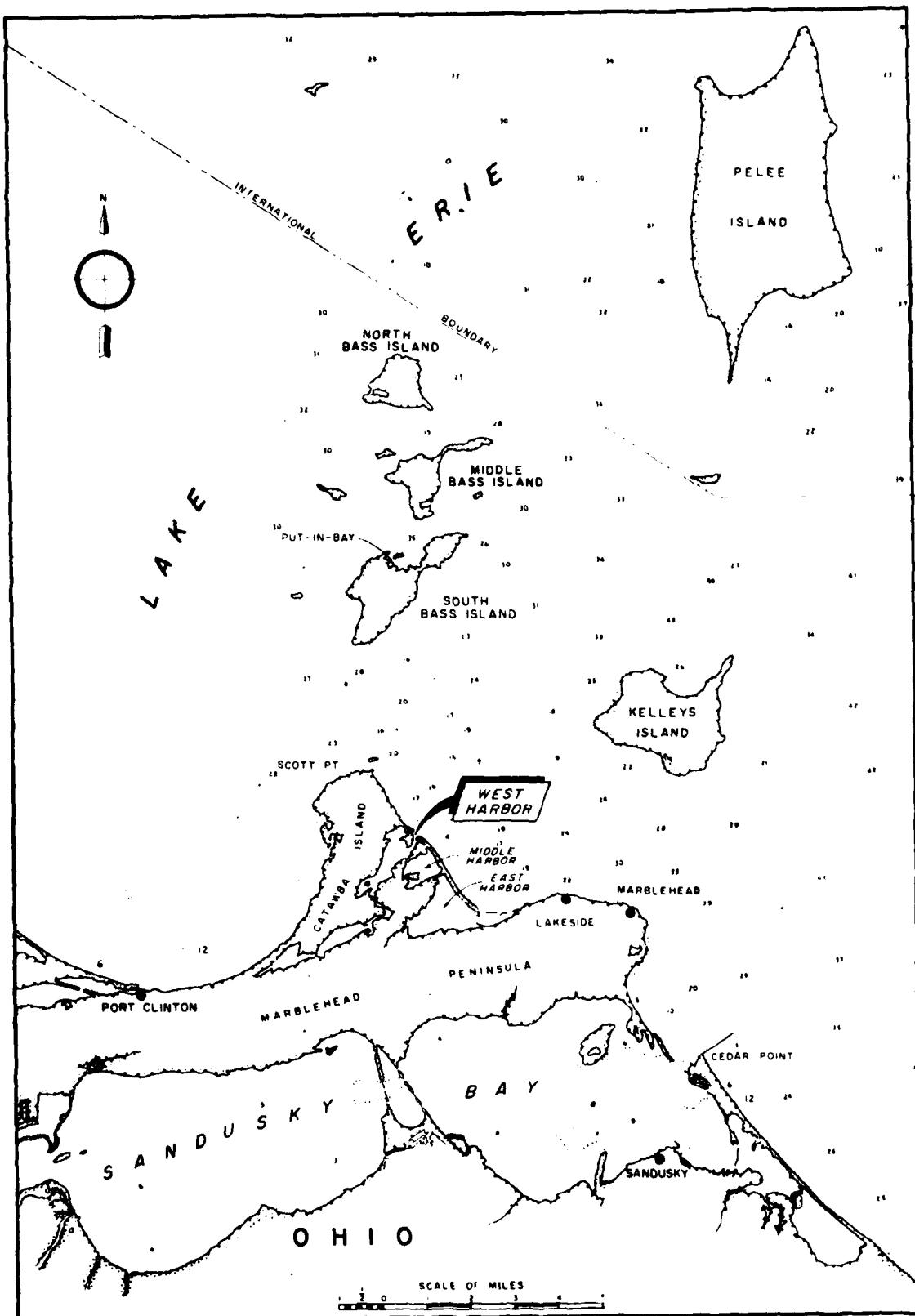


FIGURE 3 - VICINITY MAP

Erie and Huron Counties and the Marblehead Peninsula in Ottawa County. Settlement of the Marblehead Peninsula was slow due to the dense forests and swamps. The peninsula was within an almost impenetrable 30- to 50-mile wide area called the Black Swamp which extended across Northwest Ohio from what is now Sandusky Bay to Toledo. It was not until extensive drainage programs were carried out that the area began to develop on a scale commensurate with other areas in Ohio.

2.05 West Harbor was originally part of the Portage River which entered Lake Erie through what is now the natural channel to the harbor. Due to shifting of the lands and the resultant changes in the shoreline of the lake, the river gradually changed course. In the early 1900's the river entered Lake Erie just west of the center of Port Clinton.

Project Location and Size

2.06 West Harbor is a lagoon about 5½ miles long and 500 to 1,000 feet wide connected to Lake Erie by two channels, a natural channel to the east and a man-made channel (the Gem Beach Channel) to the west. Between the two is located Harbor Island, connected to the western edge of the harbor by a double span fixed bridge crossing the Gem Beach Channel. Approximately half the island is a privately owned subdivision comprised of homes and cottages. The eastern half is owned by the State of Ohio and has been maintained in its natural state.

2.07 Middle Harbor, across the natural channel to the east, is also owned by the State of Ohio and is now part of East Harbor State Park. This very shallow, irregularly-shaped lagoon is about

one mile wide at its greatest dimension. No expansion of the recreational facilities at East Harbor State Park into Middle Harbor has been made to date.

2.08 West Harbor is almost totally dedicated to shallow draft recreational water craft and vacation-type homes, cottages and trailer park development. Much of the shoreline has been altered by filled bulkhead type construction providing docking facilities which extend far out into the harbor. Several man-made slips have been developed which provide private docking for owners at their own property. Except for State-owned property in the northeastern quadrant of the harbor which is part of East Harbor State Park, much of the water area of the harbor lies over privately-owned lands.

2.09 West Harbor has the largest concentration of recreational boating on Lake Erie. Silting of the harbor entrances has been a continuing problem which hampers free access to the harbor for those docked in the area and for visiting boats seeking refuge from the rough weather conditions on Lake Erie. The depth of the harbor is dependent upon the level of Lake Erie. With the recent recession in lake level, the depth of West Harbor has decreased to approximately three to four feet.

Climate

2.10 The climate of Ottawa County, including West Harbor, is characterized by extreme variability. The mean temperature of Ottawa County is approximately 50°F (1). Temperature data recorded at South Bass Island (located approximately 6.8 miles north of West Harbor) indicate extreme high and low temperatures of 104°F and

-19°F, respectively, over 41 years of record-keeping (2). The prevailing winds occur from the west to southwest directions with an average wind speed in northwest Ohio of 11 miles per hour.

Physiography and Topography

2.11 Ottawa County lies in the Central Lowlands physiographic province and the Eastern Lakes Section subprovince. The geographic area surrounding West Harbor is predominantly characterized by slightly undulating terrain of low relief. The eastern and northern shorelines are composed of low-lying marshes and partly inundated land.

Geology and Soils

2.12 The West Harbor vicinity is underlain by sedimentary rocks of the Paleozoic Age. The bedrock is composed of dolomites of the Silurian period, including the Put-In-Bay and Raisin River formations of the Bass Island Group (3,4,5).

2.13 In areas where the dolomite bedrock is not exposed, a layer of glacial till overlies the bedrock. At certain localities, the glacial till is overlain with glacial lake deposits (1,5). The soils of Catawba Island originating from these glacial deposits, including the western shoreline of West Harbor, belong to the Millscdale-Randolph-Milton Association which directly overlies bedrock to a thickness of 20 to 40 inches and is very poorly drained. The soils of the eastern shore of West Harbor as well as those surrounding Middle and East Harbors belong to the Marsh Land Association, and are very poorly drained and swampy (1,6).

Hydrology

2.14 The Marblehead Peninsula east of Port Clinton, including Catawba Island and West Harbor, possesses no major surface water bodies other than harbors and small isolated lakes. Drainage occurs directly into Lake Erie and Sandusky Bay (1,5).

2.15 Lake Erie water currents in the vicinity of West Harbor flow generally from east to west (7). Near Catawba Island, currents traveling westward along the shore from Sandusky are met by eastwardly-directed currents from Toledo and Detroit, resulting in a combined flow directed northward between the Bass Islands and Kelleys Island and then eastward between Kelleys and Pelee Islands.

2.16 Ground water on the Marblehead Peninsula is usually obtained by drilling wells into the dolomite bedrock, although appreciable quantities may also be obtained from the overlying glacial deposits. In general, most wells are drilled to depths of 50 to 100 feet and yield 15 to 50 gallons per minute of good quality water (1,7).

Shoreline Processes

2.17 The West Harbor shoreline west of the natural channel entrance consists of a natural sand beach at Gem Beach, and a length of shoreline which is essentially stable but which periodically experiences slight fluctuations in erosion/accretion rates as natural processes re-adjust to man-made protective measures and residential development. To the east of the natural channel entrance a barrier beach approximately 300 to 400 feet in width separates Middle Harbor from Lake Erie. At the West Harbor mouth the beach rises gradually to form an essentially flat plateau of land in the shoreward

direction. However, a few hundred feet to the east the beach rises from the shore zone with a steeper slope forming a dune protected by vegetation, which gradually slopes downward on the shoreward side into low-lying marshland bordering Middle Harbor. The barrier beach extends along the shoreline to East Harbor State Park.

2.18 Erosion and accretion processes along the shoreline near West Harbor appear to be minimal. The shoreline of Catawba Island near Gem Beach is characterized by rocky headlands and cliffs with pebble and gravel beaches and exhibits negligible erosion or accretion. The sand beach at Gem Beach also appears to be stable (8). The shore in the immediate vicinity of the private channel entrance to West Harbor shows some minor erosion (Figure 4), which is probably an adjustment to local development of this reach (8). The shoreline between the private and natural channel entrances along Harbor Island has undergone inundation since 1939 due to increases in Lake level.

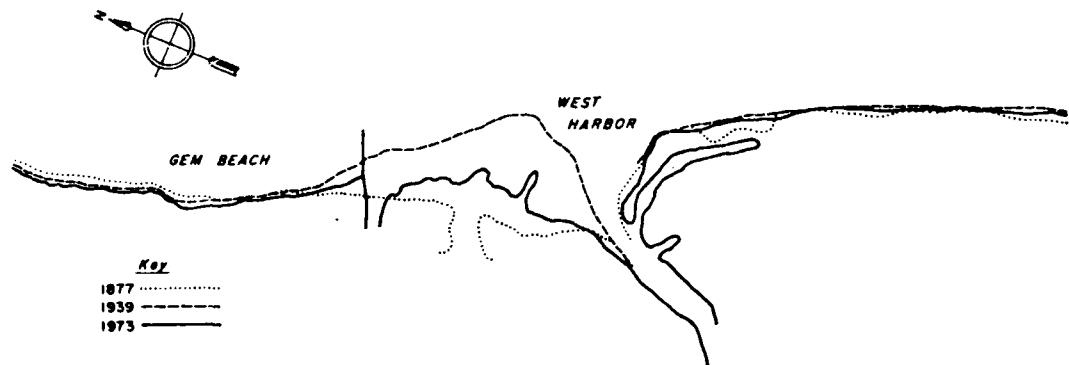


FIGURE 4 - HISTORICAL CHANGES IN SHORELINE
NEAR WEST HARBOR

Source: Ohio Dept. of Natural Resources, Division of Geological Survey

2.19 The barrier beach extending from the West Harbor natural channel to East Harbor State Park is stable at present due to the negligible effect of longshore currents in this area and to the presence of a seawall constructed in the mid-1900's along most of the beach (9,10,11). Although the beach appears to be stable, evidence exists that it was considerably wider at some point in the recent past (see discussion under Flora).

2.20 The offshore bottom deposits near West Harbor consist predominantly of a belt of fine-grained sand and gravel near shore, grading into silts and mud in deeper offshore waters. The sand probably derives from offshore sources since the sand-bearing glacial deposits along the shoreline in this area are limited in extent and protected from erosion by the exposed limestone bluffs which resist wave attack (4). Calculation of littoral transport rates indicates that material moves past the harbor in approximately equal quantities from opposite directions, indicating a relatively stable shoreline.

Aquatic Fauna

o Benthos

2.21 Benthos and sediment samples were collected concurrently during May, 1977 at six sampling stations within West Harbor and at a station in Lake Erie near the natural channel entrance (Figure E-1, Appendix E). A single grab sample was taken at each station using a Ponar dredge, and the results of the benthos analysis were converted to numbers of organisms per square meter. The types and numbers of macroinvertebrates identified at each station are presented in Table E-1, Appendix E.

2.22 In general, the greatest abundance and diversity of benthic species occurred at stations within the harbor. The absence of organisms at Station 7 in Lake Erie is attributed to both the limited size of the grab sample and to the low abundance of benthic fauna expected to occur in fine-grained shifting sand environments subjected to continuous wave and current forces (toxicity was ruled out as the cause of low faunal abundance on the basis of chemical analysis of sediment samples collected at Station 7). All tubificids collected are characteristic of mesotrophic to eutrophic environments. Branchiura sowerbyi, Limnodrilus cervix and Limnodrilus hoffmeisterei commonly occur in sediments containing high concentrations of organic material. Limnodrilus maumensis and Potamothrix vejvodskyi are common in Lake Erie's western basin. Of the chironomids, Chironomus plumosus is the dominant species in western Lake Erie. Coelotanypus sp., Procladius sp. and Cryptochironomus sp. are also widely distributed in the western basin and are associated with mesotrophic to eutrophic conditions. Coelotanypus sp. generally occurs in warmer waters of the southern and western portions of the Lake (12).

2.23 The available benthic data for West Harbor indicate that the prevailing conditions are typical of the lake bottom in the western basin of Lake Erie. The types of macroinvertebrates present are generally associated with mesotrophic to eutrophic conditions and sediments with a high content of organic matter. No indication of any toxic conditions is discernible.

o Fish

2.24 Only one specific survey of fish species has been conducted within West, Middle or East Harbors, which was performed by

the U.S. Fish and Wildlife Service in April-May, 1977. However, both the Ohio Division of Wildlife and the U.S. Fish and Wildlife Service periodically sample fish populations in Lake Erie near East Harbor. Data from 1973-1976 indicate that the species listed in Table E-2, Appendix E, have been routinely collected. All of these species were collected in West Harbor during the Spring, 1977 survey. No rare or endangered fish species as listed on the Federal list of Endangered and Threatened Wildlife and Plants (30) are known from the area.

2.25 The Catawba Island area is considered an important nursery ground for fish, as indicated by the diversity of the species listed in Table E-2 and by the large numbers of young-of-the-year fish captured during sampling surveys. It is believed that many of the fish in Table E-2 spawn in the West Harbor vicinity, although actual spawning sites have not been specifically identified (13). However, carp have been observed to spawn along the shores of Middle Harbor and along the dike separating Middle and West Harbors.

Flora

2.26 Ottawa County possesses the largest amount of marshland of any Ohio county, with the greatest diversity of aquatic and low-land plant species in the state (1). Table E-3, Appendix E, lists marsh and aquatic vascular flora found near the project area. In the West Harbor vicinity, plant communities typical of both marshland and sand dune environments may be seen. West of the natural channel the shoreline is predominantly developed land with the exception of a peninsula of state-owned property jutting into the channel at Harbor Island. This peninsula is characterized by

lowland plants and shrubs typically found in moist or marshy soils. The dominant trees are red maples (Acer rubrum), eastern cottonwoods (Populus deltoides) and black and sandbar willows (Salix sp.). An abundance of bent grass (Agristus sp.) exists as well as smaller shrubs including nannyberry (Viburnum sp.) and thornless currant (Ribes sp.). The southwestern shoreline of this peninsula shows evidence of recent inundation due to the presence of dead trees (many uprooted) and the lack of grasses and shrubs which have either decayed or have been washed away. Two islands in the natural channel exhibit a similar lowland floral composition.

2.27 The eastern shoreline of the natural channel consists of many low barren patches of sand which appear to have recently emerged from the lake due to decreasing water levels. Shoreward of these sandy areas, cottonwoods, maples and shrubs identical to those described previously predominate on higher ground, while willows, shrubs, grasses and rooted aquatics dominate as the ground slopes downward into the marshy areas surrounding Middle Harbor.

2.28 Toward Lake Erie a barrier beach exists which was described previously. A line of cottonwoods with exposed roots exists approximately 20 to 40 feet from the shoreline. Shoreward of these trees a low sand dune extends along most of the beach. Bent grass, nannyberry and sandbar willows act to hold the sand in place from wind action. Cottonwoods, maples and willow occur more abundantly as the dune grades downward into the marshy shoreline of Middle Harbor. Abundant grasses and small flowering plants such as mallow (Malva sp.) exist throughout this area (see page 123).

2.29 The presence of trees close to the Lake Erie shoreline along the barrier beach, along with the lack of any associated

smaller vegetation, appears to indicate that the beach either may have extended further into the lake at one time or that the trees may have been part of a dune which has since eroded. Although this barrier beach appears to be stable at present, this type of shoreline feature is generally transient in a geological sense and may have undergone substantial alterations in form over the past 200 years. No rare or endangered plant species as listed in the Federal Register (30) are known in the West Harbor vicinity.

Terrestrial Fauna

o Mammals

2.30 The mammals of the West Harbor area are represented by common small species including eastern cottontail (Sylvilagus floridanus mearnsii), racoon (Procyon lotor lotor), woodchuck (Marmota monax monax), opossum (Diedelphis marsupialis virginiana), skunk (Mephitis mephitis nigra) and red fox (Vulpes fulva fulva). White-tailed deer (Odocoileus virginianus) are present in low numbers.

2.31 Table E-4, Appendix E contains a more complete listing along with the status of each population in West Harbor and its adjacent locale. No endangered mammals are known to occur in the project area (14,15,16,17,30).

o Reptiles

2.32 Table E-5, Appendix E lists the reptiles which have been documented as occurring on Catawba Island in or near West Harbor. Other species found on the islands or in other parts of Ottawa, Erie, Lucas or Sandusky counties may occur near West Harbor but have not been included in the Table E-5 due to lack of recorded observations. One species listed in the table, the spotted turtle,

which is an endangered reptile in Ohio, has not been specifically documented as existing in West Harbor. However, information provided by the Ohio Division of Wildlife indicates that this species is reasonably likely to occur in the area based on knowledge of its habitat requirements and range (14). No other rare or endangered reptiles are known to occur in the project area (16,30).

o Amphibians

2.33 Table E-6, Appendix E, lists amphibians which are known to occur on the islands in western Lake Erie. Other species are likely to occur near West Harbor which do not have access to the offshore island areas and which have not been documented in published literature. No rare or endangered amphibians are known to exist in the West Harbor locale (16,30).

o Birds

2.34 The marshlands of Ottawa County provide valuable and unique wetland habitat for birds and other wildlife. Ottawa and five other nearby counties bordering Lake Erie have been classified by the U.S. Bureau of Sport Fisheries and Wildlife Wetlands Inventory as high-value waterfowl habitat (18). Two wildlife refuges presently exist in Ottawa County: Magee Marsh (State-operated) and the Ottawa National Wildlife Refuge. In addition, Middle Harbor, which has remained essentially in its natural state in spite of the recreational and residential development of East and West Harbors, has been identified as an area of ecological significance and a prime sanctuary for waterfowl and wildlife (18). Middle Harbor has also been cited as a critical resting area for migrating waterfowl (23). Attempts are being made by the State of Ohio to acquire the remaining marshlands in the Ottawa County area

not currently under state control for conservation as prime wild-life and waterfowl habitat.

2.35 Ottawa County is situated at a confluence of the Atlantic and Mississippi Flyways and as such receives considerable migrant bird visitations. Table 2 identifies the waterfowl traffic estimated for fall migration corridors which include the West Harbor area. The area surrounding West Harbor has been identified as a migration or wintering area for waterfowl (18).

TABLE 2
WATERFOWL TRAFFIC ON FALL MIGRATION CORRIDORS
OVER WEST HARBOR (18)

Type of Waterfowl	Estimated Traffic On Corridor (No. of Birds)	Degree of Utilization
Diving Ducks	251,000 - 500,000	Highest
Dabbling Ducks	101,000 - 350,000	Highest
Canada Geese	25,100 - 75,000	Moderate
Blue and Snow Geese	Estimates not made	Smallest

2.36 The Ohio Division of Wildlife has indicated that several bird species listed on the Ohio endangered species list may be found in the West Harbor area, although only one species, the king rail (Rallus elegans elegans), utilizes this area for breeding purposes. The American peregrine falcon (Falco peregrinus anatum), the sharp-shinned hawk (Accipiter striatus velox) and Kirtland's warbler (Dendroica kirtlandii) are migrants and may be seen in the Catawba Island locale only during migration periods. The common tern (Sterna hirundo hirundo) may visit the project area either as a migrant or randomly as a casual visitor. The bald eagle (Haliaeetus leucocephalus) may be present as a casual visitor from the

Ottawa National Wildlife Refuge, which is one of the few nesting sites still in existence for this species in the Great Lakes region (16).

Water and Sediment Quality

o Water Quality

2.37 Water quality samples were collected at West Harbor on February 7, 1977 and were analyzed by the U.S. Environmental Protection Agency District Office in Fairview Park, Ohio. The results of this analysis for specific parameters of concern are compared with current Ohio E.P.A. water quality standards for the near shore western basin of Lake Erie in Table 3. Data for additional parameters are compared with state standards in Table E-7, Appendix E. Where no standards are given in these Tables, no established standards presently exist. For some of these parameters, standards would be determined on a case-by-case basis by the Ohio E.P.A. as determined by toxicity studies, if deemed necessary.

2.38 Two water quality samples were collected, one from within West Harbor itself and one from Lake Erie near the natural channel entrance to the harbor. Because the lake waters experience greater dispersion effects due to waves and currents, the concentrations determined for the lake sample were generally less than corresponding values for the harbor sample. However, for both locations, the E.P.A. determined that no serious water quality problems exist (19).

o Sediment Quality

2.39 Sediment samples were collected during May, 1977, at seven sites shown on Figure E-1, Appendix E, using a Ponar dredge.

TABLE 3

COMPARISON OF SIGNIFICANT WATER QUALITY PARAMETERS
 FOR WEST HARBOR WITH OHIO E.P.A. STANDARDS
 (Additional data may be found in Table E-7, Appendix E)

Chemical Parameter	Units	Ohio Standard*	Measured Concentration	
			Harbor	Lake
Ammonia (as nitrogen)	mg/l	1.5	0.25	0.12
Phosphorus (total)	mg/l	0.025	0.05	0.02
Mercury (total)	μ g/l	0.3	< 0.1	< 0.1
Arsenic (total)	μ g/l	1.0	< 2	< 2
Cadmium (total)	μ g/l	5.0	< 10	< 10
Chromium (total)	μ g/l	50	< 12	< 12
Iron (total)	μ g/l	300	345	102
Lead (total)	μ g/l	50	< 30	< 30
Zinc (total)	μ g/l	50	76	20

*Ohio E.P.A. Standard for Lake Erie, western basin, nearshore.

The results of bulk sediment analyses for some significant parameters are compared with current U.S.E.P.A. standards in Table 4 (the results of analyses for additional chemical parameters are compared with their respective standards in Table E-8, Appendix E). The results of standard elutriate tests for these same chemical parameters are presented in Table E-9, Appendix E. The U.S. EPA indicated that the sediments "are consistent with a shallow, eutrophic body of water which has not been affected by wastes from heavy industry" (page B-22). Because of the high content of nutrients, especially phosphorus, and the large concentrations of oxygen-demanding materials, the inner harbor material may not be open lake dumped in Lake Erie (page B-22).

Air Quality

2.40 West Harbor lies within the Sandusky Air Quality Control Region. This region is classified as Priority III by the Ohio E.P.A. for all pollutants of concern (particulates, sulfur dioxide, carbon monoxide, nitrogen oxides and photochemical oxidants), which signifies that the outdoor concentration of each of these pollutants is less than the secondary air quality standard (20). Priority III represents the cleanest category of air quality in the state and implies compliance with secondary air quality standards. It can be concluded that no serious air quality problems exist in the project area.

Population

2.41 The 1975 population for Ottawa County was approximately 38,400. Census data for 1970 indicated a population of 37,099, which represented an increase of five percent over the 1960 population of 35,323. In the two decades preceding 1960, Ottawa County

TABLE 4
 COMPARISON OF PARTIAL WEST HARBOR BULK SEDIMENT DATA
 WITH U.S.E.P.A. STANDARDS ^{1/}
 (Additional data may be found in Table E-8, Appendix E)

Parameter	U.S.E.P.A. Classification		Measured Concentration by Sampling Station						
	Non-polluted	Moderately Polluted	1	2	3	4	5	6	7
Total Volatile Solids (%)	< 5	5-9	> 8	16.7	9.8	9.1	2.7	10.3	0.7
Chemical Oxygen Demand	< 40,000	40,000-80,000	> 80,000	102,500	50,800	42,400	16,700	61,900	1,560
Total Kjeldahl Nitrogen	< 1,000	1,000-2,000	> 2,000	1,070	1,250	1,864	412	491	25
Oil and Grease	< 1,000	1,000-2,000	> 2,000	110	74	102	35	160	70
Lead	< 40	40-60	> 60	52.5	32.0	42.8	47.6	33.3	< 1.0
Zinc	< 90	90-200	> 200	12.01	23.44	26.30	6.98	12.65	7.26
Mercury	< 1.0	-	> 1.0	0.200	0.246	0.204	0.262	0.228	0.100
Total PCB's	1.0-10.0 classification determined on case-by-case basis						0.031	0.010	0.017
							0.032	0.017	0.010

1/ All concentrations are in mg/kg dry weight unless otherwise noted.

experienced a much higher rate of population growth. From 1940 to 1950, the population increased 21 percent from 24,360 to 29,469. Similarly, from 1950 to 1960 the rate of growth was 20 percent. These higher growth rates are attributed to the effects of the population boom following World War II and the impact of the automobile on development patterns. Projections of future growth indicate that in the year 1995 Ottawa County will reach a population of 51,400, implying an average annual growth rate of 1.5 percent. However, the rate is expected to taper off over the next 25 years, decreasing to an average annual growth rate of 0.8 percent between 1990 and 1995. Catawba Island had 1,882 residents in 1970 which is expected to increase to 5,100 by 1995 (1).

Commercial and Agricultural Activity

2.42 Mining, manufacturing and retail commerce are vital parts of the economy of Ottawa County. Manufacturing activities make up the largest segment of employment at 35.8 percent while government activities rank second at 29.5 percent. The relative importance of other types of activity can be discerned from employment statistics presented in Table E-10, Appendix E.

2.43 Agricultural activity, which had played a major role in the local economy until 1950, has steadily declined in importance, and this trend is projected to continue in the future. The major crops being produced are corn, soybeans, tomatoes, sugar beets, grapes, apples and peaches.

2.44 Manufacturing in the county includes food processing, stone, clay and glass products, fabricated metal products and machinery production. Quarrying is extensively conducted on the Marblehead

Peninsula for limestone, dolomite and gypsum. Trucking and warehousing are also significant contributors to the local economy (1).

2.45 Much of the retail commercial activity of the Marblehead Peninsula revolves around the influx of summer tourists. The accessibility of the Lake Erie shoreline and islands attracts both transient tourists and warm-weather residents who own summer cottages in the area. The importance of recreation to Ottawa County is discussed further under Recreation.

Water and Sanitary Facilities

2.46 The principal source of drinking water on Catawba Island is shallow private wells which are used to extract ground water from the permeable glacial deposits and dolomitic bedrock (see section on Hydrology). The nearby city of Port Clinton operates a potable water intake and treatment facility, but the distribution system does not extend to Catawba Island (plans are being made to effect this extension by late 1979 or early 1980) (21).

2.47 At Harbor Island adjacent to the West Harbor natural channel entrance, a private drinking water intake exists which draws in water directly from Lake Erie. This intake serves all existing residences on Harbor Island. Although not completely developed, the island is subdivided into 60 lots. As a condition for issuance of future building permits, all new lots must connect to the planned Catawba Island water distribution system. Current status allows the present residents the option of connecting to the proposed water supply system or to continue operation of their own water treatment plant.

2.48 Sanitary wastes on Catawba Island are treated in private septic systems. Recreational boaters using West Harbor can pump out sewage holding tanks at several stations located within the harbor including:

- o Catawba Midway Marina
- o Foxhaven Marina
- o Gem Beach
- o East Harbor State Park Marina
- o Anchors Away Marina
- o Harbor Acres Marina

The pump out stations use a variety of treatment methods. Some provide only solids removal, while others utilize filtration followed by either chlorination (with subsequent release into Lake Erie) or septic leaching. The remaining stations which do not provide treatment are periodically unloaded by trucks for transport to county-operated land disposal sites in Danbury Township or to a sewage treatment plant in Fremont (Port Clinton does not operate such a facility).

2.49 The only remaining major source of sanitary waste on Catawba Island is East Harbor State Park. Five sanitary collection stations are located within the Park which provided extended aeration activated sludge treatment for a combined flow of 0.235 million gallons per day (22).

Transportation

2.50 Ottawa County's transportation network includes a good highway system, airline and ferry service. The roadway system includes the Ohio Turnpike and State Route 2, a limited access freeway. In addition, State Route 163 provides the principal east-west access route for vehicles along the entire length of the Marblehead Peninsula through Port Clinton. The Port Clinton Municipal Airport

provides passenger and cargo service between the Marblehead Peninsula, the Bass Islands and Kelleys Island. Ferry service exists from Sandusky, Port Clinton, Catawba Island and Lakeside to the Bass Islands, Kelleys and Pelee Islands and the Canadian mainland.

Recreation

2.51 Ottawa County offers extensive opportunities for recreation and tourism. On the Marblehead Peninsula, several large commercial tourist attractions exist, including Mystery Hill, Prehistoric Forest and African Safari. The city of Lakeside contains approximately 700 cottages and hotel rooms to accommodate vacationers and summer residents. Boat service to the Islands attracted 84,000 visitors to Kelleys Island and 175,000 visitors to South Bass Island in 1975.

2.52 Major parks in the area are summarized in Table E-11, Appendix E. East Harbor State Park, located southeast of the project area, receives over 1.5 million visitors annually. The park has 600 camping sites, a boat launch and marina and a swimming beach which was once one of the finest on Lake Erie. Other local interests have constructed numerous marina facilities along the lagoon shoreline. The State has improved the natural harbor entrance by constructing two parallel, shore-connected breakwaters in Lake Erie and deepening the channel to 4½ feet. Boating-related activity is the major recreation at West Harbor with about 2,600 vessels berthed within the harbor. The recreational boating season extends from late May through September. In addition, sport fishing in the West Harbor vicinity is extensively conducted. In 1975, the three areas of Lake Erie which experienced the greatest boat angler pressure (the average number of boats per hour per unit area) were in order:

(1) Gem Beach; (2) South Bass Island; and (3) the mouth of East Harbor (31).

2.53 Numerous boating mishaps occur during the boating season at West Harbor. Most accidents which are reported to the Coast Guard involve boats which have gone aground or been otherwise damaged while waiting to enter the Gem Beach Channel. During storms, boats sometimes form a single file-line extending 1-1½ miles into Lake Erie as they wait their turn to enter West Harbor. The rocky shoals in this area contribute towards making the Marblehead Coast Guard Station one of the two busiest stations on the entire Great Lakes (23). The Coast Guard states that for every boat requiring their help, up to twice as many free themselves. In 1975, the Coast Guard reported 11 rescue calls. Between 1969 and 1975, the Coast Guard Auxiliary has documentation of 74 calls for assistance and have provided as many as 15 tows/weekend at the Gem Beach channel.

Historic and Archeological Resources

2.54 Table E-12, Appendix E, lists the major historical and archeological sites in the vicinity of the Marblehead Peninsula. It was determined from consultation with the Ohio Historical Society that the proposed project at West Harbor would not impact any known historical or archeological sites (24). An archeological survey was conducted in the summer of 1978 at the proposed upland disposal sites, as per Ohio Historical Society correspondence (see Appendix B). No archeological sites have been identified in the project area. Since the project involves areas situated under water, no historic sites would be impacted. The State of Ohio does not presently conduct any programs of underwater archeological exploration and preservation; however, no known sunken vessels of historic importance are situated near West Harbor.

SECTION 3
RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

Regional Development Plans

3.01 A regional development plan was developed for Ottawa County in 1971 to provide for the future needs of the county with regard to the expected growth of the population and commercial expansion to the year 1991 (1,25). Among the recommendations was a proposal for the development of two water-oriented commercial resorts in the county, one on Catawba Island near West Harbor and one in Danbury Township along East Harbor. These resorts would include marinas and fueling, docking and storage facilities for recreational water craft to fulfill the recreational needs of the expanding tourist and residential populations.

3.02 Catawba Island, west of State Route 53, was recommended as one of two sites in the county for the development of additional resort housing, although the amount of such housing which would be required by 1995 was not determined. It was also recommended that 38 acres of parkland be acquired near the northern tip of Catawba Island northwest of West Harbor.

3.03 The Regional Development Plan has designated the land use of the West Harbor area for "Resort - Commercial" usage. The land is currently being used in this type of activity and as a center for recreational boating activity. As the proposed project will promote this type of development the plan is compatible with the long range planning for Ottawa County.

3.04 The greater accessibility of the harbor to boat traffic would attract both boaters and fishermen. The value of Lake Erie as a unique recreational resource of this area would be realized by the increased accessibility and utilization of West Harbor and the enhanced opportunities for shoreline recreation.

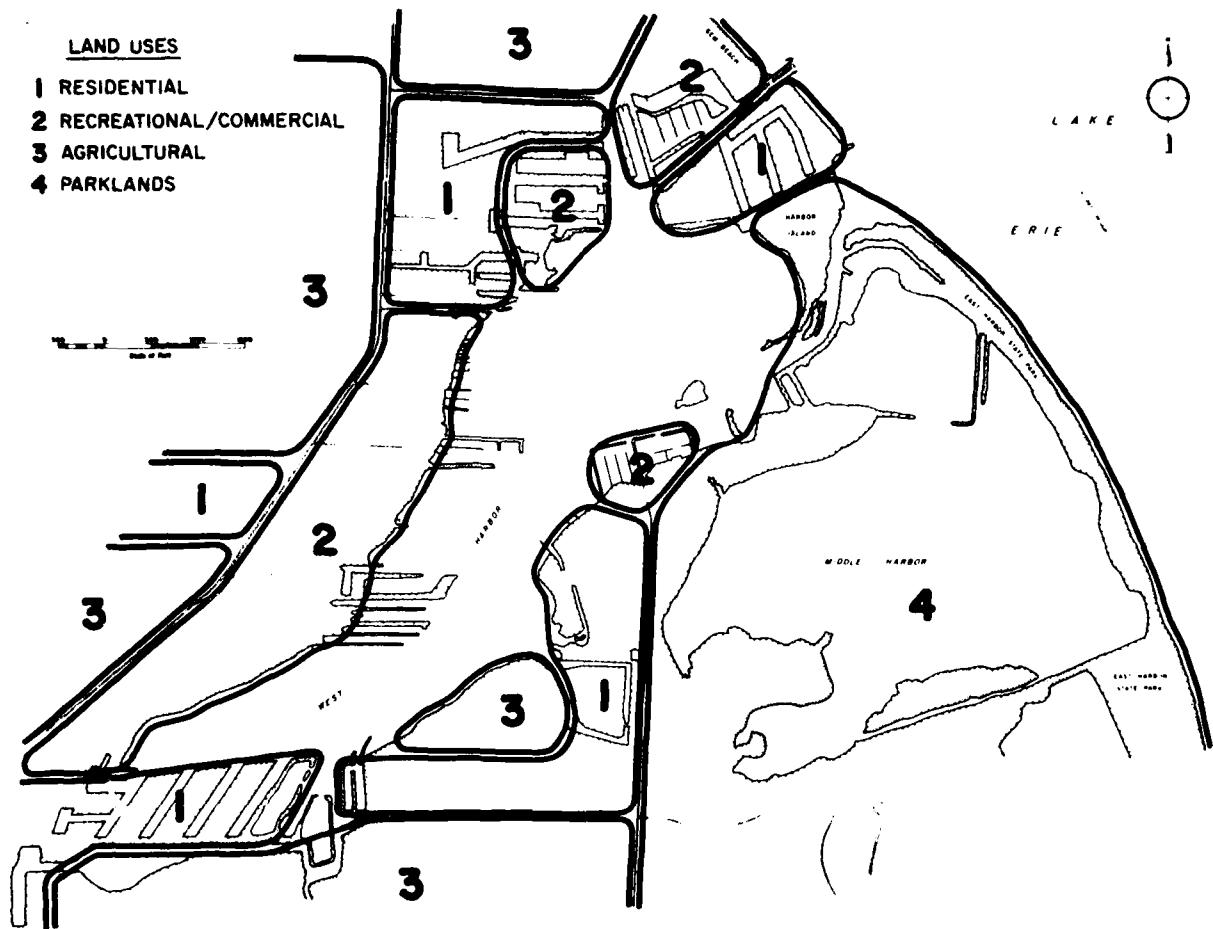
Zoning

3.05 Catawba Island Township has been zoned into districts on the basis of existing land uses and proposed development plans (26). The shoreline areas adjacent to West Harbor, including most of Harbor Island, have been designated predominantly for recreational-commercial purposes and mobile home parks (See Figure 5). The peninsula of land between Harbor Island and the natural channel entrance is state-owned property and therefore not affected by local zoning regulations.

Recreational commercial uses include marinas, boat docks, fishing piers, boat service and storage, commercial recreation facilities such as golf courses and sales of boating and fishing supplies. These uses are compatible with any anticipated development that may occur as a result of the proposed harbor improvements.

Recreation

3.06 A principal goal for Ottawa County as set forth by the Ottawa County Regional Planning Commission emphasizes maintenance of public access along the major waterways, Lake Erie, and appropriate minor tributaries in order to meet future open space and water oriented recreation needs (27).



SOURCE: Zoning Map for Catawba Island Township

FIGURE 5 - ZONING MAP

The proposed project is in keeping with these goals. Breakwater construction would provide safer access to Lake Erie, and channel dredging would provide sufficient water depth for recreational boaters using the Ottawa County public launching ramp at West Harbor.

Other Federal Projects in the Area

3.07 Flood insurance studies are being conducted for the U.S. Department of Housing & Urban Development in Ottawa County and specifically Catawba Island. The only other known federal project in the area is the planned improvement of docks in the marina at East Harbor State Park, subject to final approval of a Land and Water Conservation Fund application. The proposed project would have no effect on either of these federal projects.

SECTION 4
PROBABLE IMPACT ON THE ENVIRONMENT

Hydrology and Littoral Processes

4.01 Littoral transport and water circulation patterns in the vicinity of the West Harbor natural channel entrance would be affected by the presence of the proposed arrowhead breakwater. The configuration of the breakwater is designed to minimize shoaling at the entrance. It is anticipated that littoral drift transported by winds from a northeasterly to easterly direction would accrete on the south side of the south breakwater. This arm of the breakwater would connect to the shoreline and would slow the movement of water, causing the sand and other littoral materials to settle. Land accretion in this location would produce beneficial impacts by widening and stabilizing the barrier beach near the mouth of the natural channel.

4.02 Winds from a north to northwesterly direction would produce littoral currents moving southeast toward the north breakwater. Since this structure would not be connected to the shoreline, accreting sand would tend to be flushed from the gap between the shoreline and the breakwater by the increased velocity of the waves and currents passing through this narrow opening.

Water and Sediment Quality

4.03 Water quality in the project area would experience minor temporary degradation during construction and dredging operations due to resuspension of silts and clays, causing turbidity. Operations in the lake and near the channel mouth would generate only minor turbidity, since most of the material to be dredged in this area is fine sand, as indicated by logs of borings (see Figures E-2, E-3, and E-4, Appendix E). Within West Harbor, the dredged material would be predominantly soft silts, which would generate considerably more turbi-

dity. However, the calmer waters within the Harbor would limit the lateral dispersion of these resuspended materials and would permit rapid resettling to the harbor bottom. An increase in litter dumped overboard may be associated with the expanded utilization of West Harbor, but this is not expected to produce a significant impact on water quality. A decrease in turbidity caused by prop wash would result due to the deeper channels created by this project. However, an increase in turbidity may be generated along the shoreline in shallow waters by waves in the wakes of the larger number of boats using the channel. The long-term impacts of this project on water quality are expected to be minor.

4.04 No consequential changes in sediment quality are anticipated as a result of this project.

Air Quality

4.05 The potential impacts on air quality during construction of the planned breakwaters and dredged material containment facility and during dredging operations would be minimal. The transitory nature of construction operations, the small quantity of pollutants emitted by construction equipment and dredges, and the strong dispersive effects of nearshore winds would act to mitigate any adverse impacts on the air quality of shoreline communities.

4.06 The potential long-term air quality impacts resulting from increased usage of West Harbor by recreational boats and the attendant increase in automotive traffic and residential development would similarly be minimal. Impacts from these sources would be seasonal, occurring for the most part from late spring through early fall. Strong offshore and nearshore winds would disperse pollutants rapidly, preventing any major degradation in air quality of populated shoreline areas. Since the air quality of the West Harbor area meets all Ohio secondary air quality standards, no threat to the health of

shoreline residents would be presented by the proposed project or any accompanying secondary development.

Aquatic Fauna

o Benthos

4.07 The construction of two steel sheet pile breakwaters near the West Harbor natural channel entrance would require the removal of approximately 91,000 square feet of bottom habitat. As stated previously, the bottom in this area is composed of fine, shifting sands which are subject to wave and current forces, creating an unstable environment for benthic organisms. The anticipated low abundance and diversity of benthos under such conditions were supported by samples collected near the West Harbor natural channel entrance (stations 6 and 7, Table E-1, Appendix E).

4.08 Dredging of the recommended channel would temporarily remove approximately 80 acres of existing bottom habitat, while creating an equal amount of new habitat. The benthic organisms removed with this dredged material would probably be destroyed. However, the benthic macroinvertebrates present in West Harbor are typical of harbors throughout western Lake Erie, so the loss of individuals along the dredged channel would not adversely impact the local aquatic food web. After dredging has occurred, recolonization of the dredged area should take place, with perhaps some initial changes in species abundance and/or diversity occurring as a response to the altered substrate conditions. As the bottom returns to its original composition due to sedimentation of suspended solids and organic debris and deposition of sand, the benthic community would revert to the same conditions as existed before dredging occurred. Therefore, no major adverse impacts would occur from dredging the recommended channel on the benthic or the general aquatic community.

o Fish

4.09 Construction of the breakwater and dredging would be scheduled to minimize the impacts on fish spawning. West Harbor experiences the greatest pressure from spawning fish between early April and late May. At this time, fish seek to enter the harbor to spawn. Therefore, in-water work would not be scheduled to begin until June. During the remainder of the year, breakwater construction would produce negligible impacts on local fish populations.

4.10 Once the breakwaters are constructed, the previously flat sand bottom at the construction site would be replaced by a vertical steel wall on one side of each breakwater and an underwater mattress of riprap on the opposite side over a combined total distance for both breakwaters of 2350 feet. Rubblemound structures at the lake-ward ends of the breakwaters would add an additional 295 feet to the total length. Some species would be benefited during spawning periods by the riprap and rubblemound structures which would provide new spawning areas. However, the utility of these areas for spawning purposes would diminish as littoral drift accretes adjacent to the breakwaters and covers the rougher stone surfaces. No anticipated long-term negative impacts would occur on local fish populations from the presence of breakwaters at West Harbor.

4.11 Dredging of the recommended channel would have the greatest adverse impact on fish during spawning periods, as described for breakwater construction. Dredging at other times of the year would have minimal adverse effects on fish.

Turbidity may have a short-term adverse effect, but this impact would be mitigated by rapid settling of resuspended silts and clays in the calmer waters of the harbor. No long-term adverse effects on the West Harbor fish community would occur due to dredging of the recommended channel.

Flora

4.12 The construction and long-term presence of the breakwaters near the natural channel entrance would have no impact on terrestrial flora.

4.13 Dredging of the recommended channel would include the removal of 26,000 square feet of terrestrial habitat, including the complete removal of a small island and partial removal of another nearby island in the natural channel. Some of this land area is composed of sand beaches bereft of flora. Vegetated areas which would be removed are dominated by floral species commonly found throughout the West and Middle Harbor locales, including bent grass, shrubs and small willows. The removal of these vegetated land areas would not adversely affect the remaining floral community.

Terrestrial Fauna

o Mammals

4.14 The major impact on the mammals of West Harbor from breakwater construction and dredging operations would be noise generated by construction equipment offshore and by onshore support activity. The predominantly smaller mammals inhabiting the areas likely to be most affected (the peninsula of state-owned land adjacent to Harbor Island and the barrier beach bordering Middle Harbor) would probably seek more tranquil surroundings some distance from the natural channel. Once work is completed, the dredged channel would continue to

produce noise impacts on adjacent land areas by the induced increase in boat traffic. However, this impact is judged to be minimal. The completed breakwaters would produce no adverse impacts on the local mammal community.

4.15 Some terrestrial habitat would be removed as part of dredging operations. The total quantity of land involved is small, and, as stated previously, some of this land is sand beach or only sparsely vegetated. The island areas to be removed probably receive little use by mammals due to the limited access offered by their location in the natural channel.

o Reptiles

4.16 Information on reptiles in the West Harbor area is rather skimpy. However no long term adverse impacts are anticipated.

4.17 The removal of terrestrial habitat during dredging operations would produce a minor impact on reptiles, but the quantity of land involved is not sufficiently great to cause any significant change in the carrying capacity of the local environment or otherwise the size of any known reptile population in the area.

4.18 The spotted turtle (considered endangered in Ohio) which may occur in the West Harbor area, would probably not be adversely affected by the proposed project. These turtles prefer small, shallow bodies of water such as ponds, small streams and bogs, while avoiding sizable bodies of water (28). If a population of this species does exist in the West Harbor vicinity, the quieter, marshy areas of the inner harbor and areas surrounding Middle Harbor would probably be the preferred habitat over the more hydrologically dynamic natural channel entrance and

the shoreline of Lake Erie. The land areas taken as part of the channel dredging would probably not be frequented by this species, so that the planned construction and dredging operations would have no significant effects on the survival and environmental requirements of the spotted turtle.

o Amphibians

4.19 The construction and long-term presence of the planned breakwaters would produce insignificant impacts on the amphibians of the West Harbor area. Of the species listed in Table E-6, Appendix E, only the mud puppy (Necturus maculosus maculosus) would be likely to frequent the waters of Lake Erie near the proposed construction site. A few individuals may be lost by burial under dumped riprap during breakwater construction, but the degree of this impact is expected to be insignificant.

4.20 The removal of land associated with dredging the recommended channel could potentially produce a minor adverse impact on the local amphibian community due to habitat loss, but this impact is not deemed to be sufficiently adverse to cause significant changes in the size of any local amphibian population.

o Birds

4.21 Birds frequenting the West Harbor area would be temporarily impacted by noise from dredges and construction equipment during the project construction period. This impact would be expected to be minimal, however, since birds frequenting the vicinity would probably seek nearby quieter areas in West Harbor.

4.22 The increased noise created by induced boat traffic in the harbor would similarly produce minimal adverse impacts on the local bird community, including rare or endangered species. No significant long-term impacts would accrue to local bird populations from either breakwater construction or channel dredging.

Population

4.23 No people would be displaced by the proposed project. Warm weather residency would undoubtedly increase during the boating season, but no significant increase in year round population is expected.

Commercial and Agricultural Activity

4.24 An increase may be expected in commercial and business activities associated with recreational boating. This increase would be gradual as additional berthing facilities are developed. Agricultural activity, which is primarily located away from the shoreline of Catawba Island, would not be significantly affected by the proposed project. Roughly 97 acres of farm land would be used as an upland dredged material disposal site. However, this land would be returned to farming purposes in 2-3 years, enriched by the harbor sediments tilled into the soil.

Transportation

4.25 Additional roadway traffic would increase during warm weather months because of the proposed improvements. Automotive congestion which now exists during weekend periods could increase.

Recreation

4.26 Recreational boating would increase as a result of this project. Table 5 summarizes the types and numbers of boats presently using West Harbor and projects the size of the local fleet both due to natural growth and growth which would be induced by the proposed project. As warm weather residency increases, additional demands would be placed on existing land-based recreational facilities. Construction would begin in June to avoid impacts on spawning fish. Although this time of year corresponds to heavy usage of the area by recreational boaters, the Gem Beach channel would remain open to allow access to the harbor. In addition, concentrated boating activity would occur predominantly on weekends, thus minimizing construction impacts on boaters during most of the week.

TABLE 5
PRESENT AND PROSPECTIVE LOCALLY-BASED FLEET

Type of Craft	Length in Feet	Present Fleet	Prospective Fleet			Total End of 50 Years
			Add for Natural Growth	Added Because of Improvement	New Transferred	
Outboards	Under 20'	340	270	0	0	610
Inboards & Cruisers	17' - 26'	1,280	0	960	320	2,560
Cruisers	27' - 40'	890	0	670	220	2,560
Cruisers	41' - 65'	20	0	15	5	40
Sailboats	Under 17'	10	10	0	0	20
Sailboats	17' - 26'	60	0	45	15	120
Totals		2,600	280	1,690	560	5,130

Historic and Archeological Resources

4.27 The project would have no impact on any properties listed or eligible for listing in the National Register of Historic Places. The State Historical Society stated that no known archeological or historical sites exist in the project area (24). However, an archeological survey of proposed upland disposal sites was conducted, see paragraph 2.54.

Property Values and Tax Revenues

4.28 Property values would increase as owners develop additional facilities to serve recreational boaters attracted to the improved harbor. Tax revenues would rise as a result of increased property valuations.

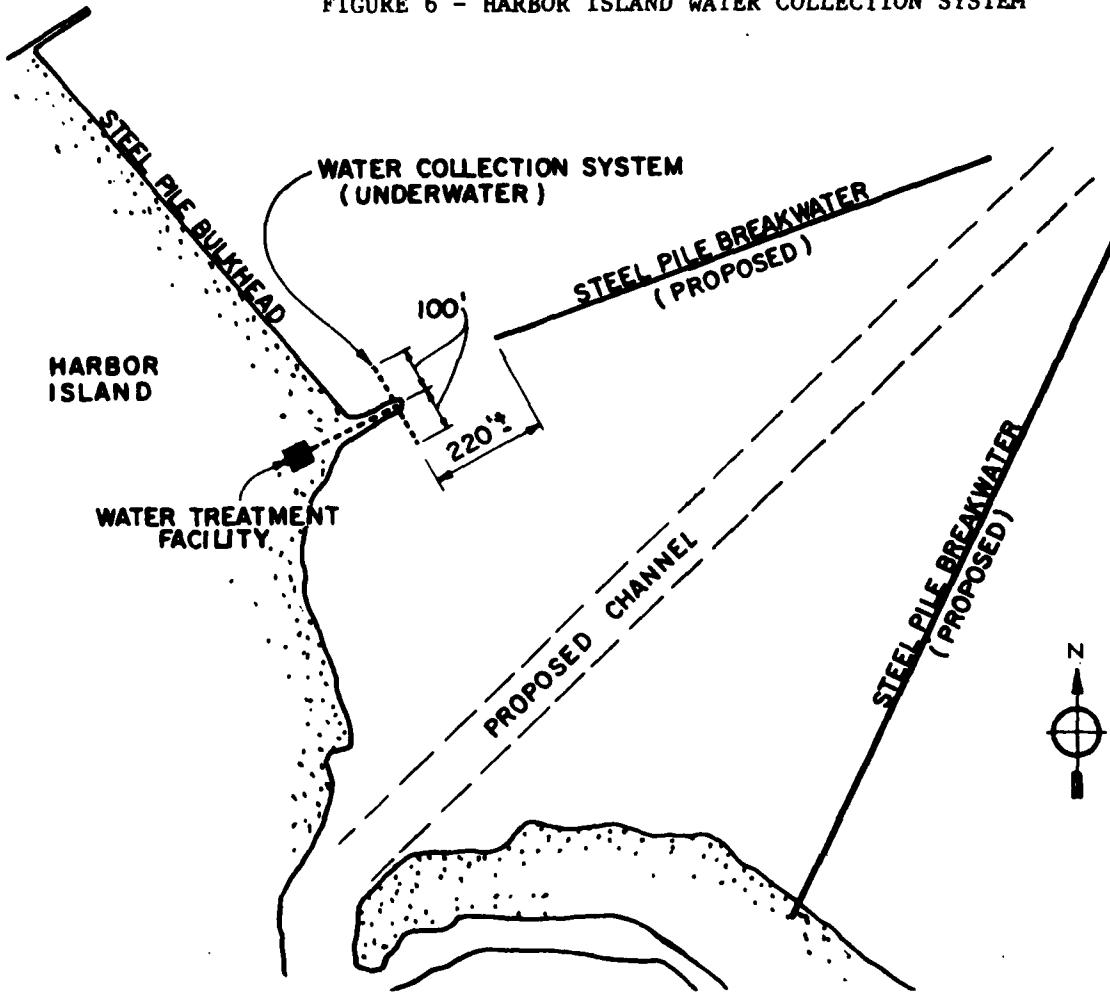
Water and Sanitary Facilities

4.29 The Catawba Island water distribution system now in the planning stage should be completed and operative near the time construction begins on the navigational improvements. The water supply should be sufficient for any expected increase in population. The development at Harbor Island at the time of this writing, which is served by the existing private water intake mentioned previously, may elect to retain use of this intake or connect to the new distri-

bution system.

4.30 The existing water intake at Harbor Island is situated approximately 220 feet from the closest point of approach of the planned breakwaters and lies under about two feet of sand beneath the lake bottom (see Figure 6). If this facility is still in use during construction of the project, the water intake flow rate may possibly be hindered by silt and other fine materials accumulating on the sand overlying the intake from construction and reducing the flow of

FIGURE 6 - HARBOR ISLAND WATER COLLECTION SYSTEM



water through the sand. Mitigating measures include extending the intake structure and/or the installation of stronger pumps (back-flushing when necessary).

4.31 Once construction is completed, the water intake at its present location may experience one of several possible effects:

1. there may be no change to the quantity or quality of water pumped;
2. additional sand may accrete over the intake, possibly reducing the rate of flow through the intake;
3. the sand overlying the intake pipes may be scoured away by the flushing action of increased water velocities in the gap, causing more silts and fine materials to be pumped ashore with the water which might otherwise have been filtered out by the overlying sand.

Since the underwater intake pipe lies in the gap between the north breakwater and the shoreline, the actual impact on the intake would depend on the rate of sand accretion near this breakwater and the expected increase in velocity of water currents and refracted waves passing through this gap and creating a flushing action.

4.32 As additional marina facilities are developed, the need for more sanitary waste disposal stations would increase. Under current regulations, any marina with more than seven berths must provide pump-out facilities. Additional facilities similar to those which are now used could easily be provided, subject to approval of the Ottawa County Board of Health and the Ohio Environmental Protection Agency. More advanced methods of treating these wastes, other than septic treatment, may be provided if increased waste loads in the future would degrade the water quality of West Harbor. The addition of new pump-out facilities would be in keeping with recent federal regulations limiting the discharge of sewage from boats on the Great Lakes. All new marina facilities will be required to have pump-out facilities with a minimum holding capacity of 1,500 gallons. John Baughman, Chief of Sanitation in Ottawa County stated that there are land disposal areas around West Harbor for double the pumpout facilities now in use.

New Development and Secondary Impacts

4.33 Most new development is expected to be immediately along the shoreline in the form of additional docking facilities and other marina development. Some development of trailer parks and other summer cottage-type housing would also occur, but more slowly and under the restrictions of zoning codes. Development of this nature would be in accordance with the long-range planning objectives of Ottawa County. Any new development would be subject to the zoning regulations of the County or Regional Planning Commission. All future development would be subject to Ohio Environmental Protection Agency guidelines which limit development that may degrade the quality of Ohio's water.

Aesthetics

4.34 The proposed project would alter the aesthetics of the West Harbor area during the construction period due to noise, exhausts, and the presence of the equipment itself, but these impacts would be temporary as the construction period is relatively short. Continued maintenance dredging every five years would again cause only a minor temporary impact on aesthetics. The presence of the breakwaters would create a visual impact if the steel sheet pile alternative was adopted, as opposed to the rubblemound alternative which would blend more naturally with the surroundings. The increased use of this harbor by recreational boats would also alter present aesthetic values to some degree, but this impact would be mitigated by the fact that this type of activity does not conflict with the major pursuits of those using the harbor or living on its shoreline. The major aesthetic impact may consequently be the attraction of larger numbers of people to the area.

4.35 The material to be dredged from the lake channel and the natural channel entrance is primarily sand and is excellent material for beach nourishment. The nearby public beaches at East Harbor State Park is the logical recipient for this material. The park, which was once the most popular in the Ohio park system, has experienced attendance lags attributed to the loss of the mile long stretch of sandy beach. Records indicate 800,000 swimmers used the beach in 1971 while only 240,000 used the beach in 1976. Loss of beach area began as the water level in Lake Erie rose and was accelerated by storms which washed away the sand. Suitable dredged material would be placed into the littoral system as near shore as practical. Normal currents and wave action are anticipated to stabilize the material and establish beach area as the water levels return to more normal elevations.

4.36 Material dredged from the interior of West Harbor has been determined to be unsuitable for open water disposal in Lake Erie (pg. B-22). Upland sites have been identified for diked disposal areas. Further discussion concerning the proposed disposal sites and alternatives considered may be found in Section 6.

Measures to Mitigate Impacts on the Environment

4.37 Various mitigating or protective measures would be undertaken either directly as part of the proposed project or indirectly through local assurances. Mitigating measures directly associated with the proposed project include the use of dredged sand for beach nourishment (as discussed under paragraph 4.35), which would minimize the potential impacts of the proposed breakwaters on littoral transport in the vicinity of East Harbor State Park. Other dredged materials which would be deposited at upland disposal sites would enrich and condition the soils in these areas and enhance agricultural productivity after dewatering and tilling.

4.38 The breakwater located near the Harbor Island water intake has been designed to minimize any anticipated impacts on water quality. However, should any unforeseen problems arise which would affect either the quantity or quality of potable water available at this site, local assurances have been provided to avert these impacts.

4.39 Construction and dredging operations would be scheduled to avoid interference with fish populations during months of the most intense spawning activity in the West Harbor area.

4.40 Dredging would be performed using hydraulic suction equipment and pumped directly to the disposal sites via pipelines and, if necessary, auxiliary pumps. This procedure would minimize turbidity and the release of pollutants into surface waters of West Harbor.

4.41 The Contractor will be under guidance of CE 1300 (environmental guidelines for construction contracts) which will reduce degradation of the environment during and resulting from construction operations.

4.42 A standard clause in the technical provisions of the contract will read: "All items having any apparent historical or archeological interest which are discovered in the course of any construction activities shall be carefully preserved. The Contractor shall leave the archeological find undisturbed and shall immediately report the finding to the Contracting Officer so that proper authorities may be notified." A pre-construction plan for protection and preservation of archeological and/or cultural resources discovered will be submitted to the Corps for approval. On-site Corps inspectors will insure that the contractor follows this plan. The detailed plans of protection and/or salvage will be completed at the time of discovery.

SECTION 5
ANY PROBABLE ADVERSE EFFECTS WHICH CANNOT BE AVOIDED

5.01 Dredging of the recommended channel would result in the removal of 690,500 cubic yards of dredged materials. Approximately 125,000 cubic yards of this material are composed of clean sands which would be suitable for use as beach nourishment along the barrier beach facing Lake Erie. However, the remaining material to be dredged has been determined unsuitable for open lake disposition in Lake Erie (pg B-22). The material is low in heavy metals but high in organics and phosphorous and as such would require a confined disposal site.

5.02 A number of possible sites for confinement of dredged materials from this project were investigated. In consideration of comments generated during review of the draft environmental impact statement and in consultation with the Ohio Department of Natural Resources, Fish and Wildlife Service and EPA, upland disposal sites were identified and recommended as the optimum disposal alternative. Two sites have been chosen, one located at the southern boundary of West Harbor and presently used for farming, and the other located at East Harbor State Park which is a former dredged material disposal site. These areas are identified as Sites 1 and 2, respectively, in Figure 8. No major adverse effects are anticipated as a result of the use of upland sites for dredged material disposal.

5.03 Initial and maintenance dredging operations would remove and destroy any benthic community in the proposed channel. However, this would be only a temporary impact since recolonization of the area would gradually occur. The benthic fauna identified in West Harbor are common to enriched harbors of the Great Lakes, and the loss of organisms during dredging would not likely produce serious adverse

impacts on either the abundance of these organisms in the West Harbor vicinity or the local aquatic food chain.

5.04 Turbidity generated by dredging will be a minor short-term impact. In the long run, turbidity levels in the natural channel and in West Harbor will be reduced by the presence of a deeper navigational channel, which would not be as subject to the effects of prop wash as the present shallower bottom.

5.06 A possible adverse environmental impact may occur at the Harbor Island water intake. The intake extends into Lake Erie between the proposed north breakwater and the shoreline. Details of this potential problem and mitigating measures taken are discussed in Section 4, paragraphs 4.01, 4.30, and 4.31.

5.07 The breakwaters would cover approximately 1.6 acres of lake bottomland. Existing aquatic organisms in these areas would be destroyed. However the steel sheet pile breakwater would be reinforced with rubblemound thus creating a new aquatic habitat.

SECTION 6
ALTERNATIVES TO THE PROPOSED ACTION

Alternative 1 - No Action

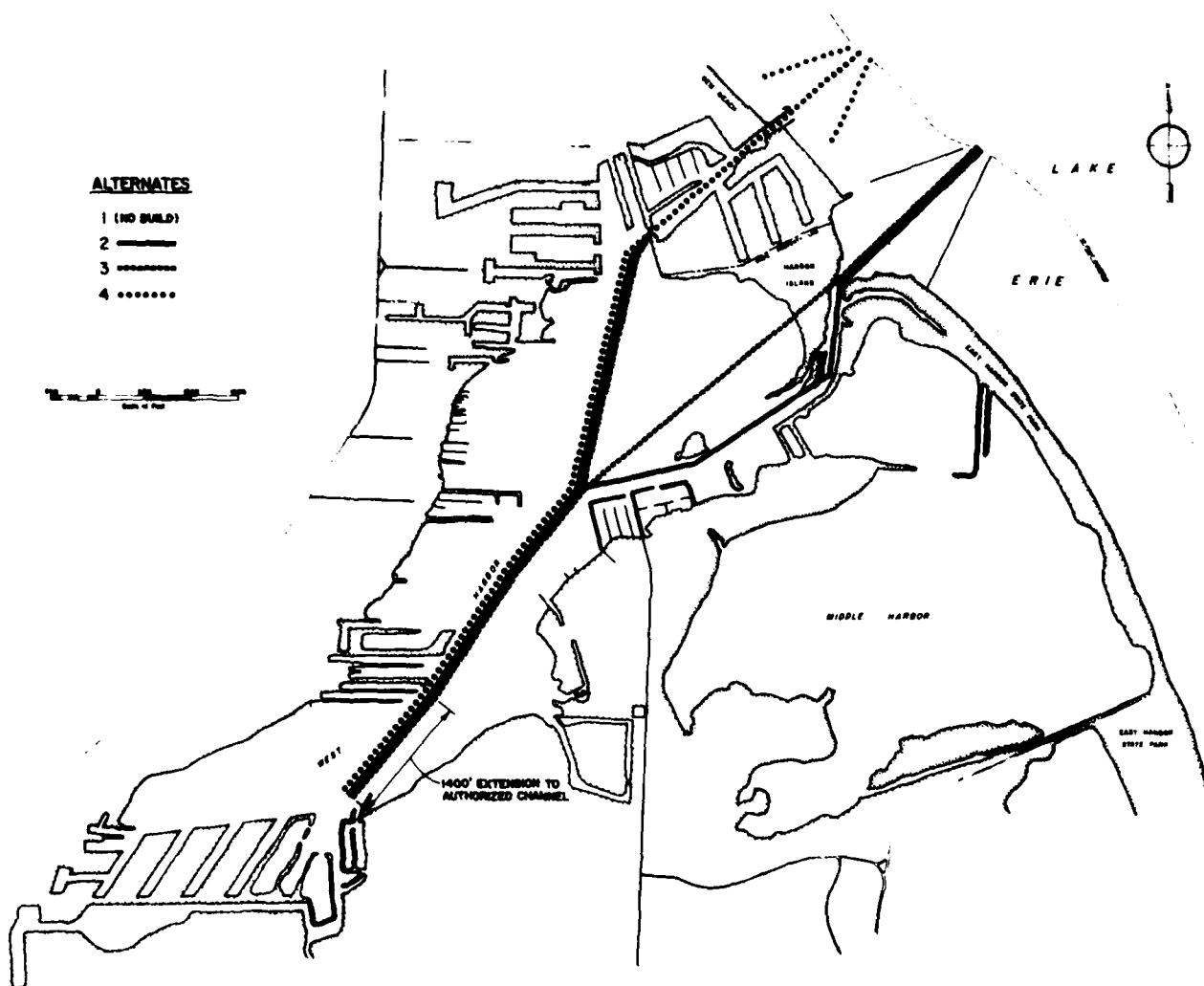
6.01 Alternative 1, the no-action plan, would have no beneficial effects on the nation or regional economic development nor contribute to the enhancement of environmental quality. Its adoption would be a continuation of the restricted recreational usage of the West Harbor facilities. The combination of continued shoaling and the anticipated lower water levels of Lake Erie would virtually close the natural channel to boat passage. Damage to craft attempting to use the natural channel and boat traffic congestion at the Gem Beach channel would sharply increase. The effect that this alternative would have upon various economic and environmental factors is difficult to assess; however, field observation, interviews, and discussions with present users indicate that continued restricted usage would have an adverse effect upon revenue derived from recreational boating supplies, service, and replacement of harbor facilities, waterfront property maintenance and improvements and upon the social well-being of the surrounding area. All other alternatives are shown in Figure 7.

Alternative 2 - Natural Channel Plan

6.02 Alternative 2, the natural channel plan, is the recommended plan and has been described previously in this report.

Alternative 3 - Harbor Island Channel Plan

6.03 Alternative 3 consists of two breakwaters and a dredged channel to the West Harbor natural channel mouth similar in width and depth to that described as part of the recommended plan (Alternative



2). At the channel mouth a new channel 80 feet wide and 8 feet deep would continue across the peninsula of state-owned land over a distance of 550 feet and then into West Harbor for a total distance of approximately 3400 feet. Near the center of the harbor the channel would take the same alignment as under the recommended plan, forming a "Y" with one arm extending southward about 4,050 feet and one northward about 2,820 feet to the vicinity of the bridge over the Gem Beach channel. Dredged material from the lake channel and the state-owned section of Harbor Island would be used for beach nourishment at East Harbor State Park. Material dredged from the inner harbor would be placed in diked areas.

6.04 As with the recommended plan, this alternative would provide two channels with adequate depth to accommodate all drafts of craft expected to utilize the harbor. In addition, the existing natural channel would be available for shallower draft vessels. The growth of recreational boating and the use of West Harbor as a harbor of refuge for boaters would be enhanced by this plan. Suitable material for beach nourishment would be decreased by 2500 cubic yards with this alternative, while the amount of material requiring containment would increase by 19,700 cubic yards. The costs of this alternative are presented in Table 6.

6.05 About two acres of terrestrial habitat would be converted to aquatic habitat with this alternative. The proposed channel would also separate the southeastern end of the state-owned peninsula from Harbor Island, creating an island. The presence of the new channel would restrict access to this island for most small mammals and reptiles which presently inhabit this area, causing a loss of usable habitat. However, the channel would create 1100 feet of new shoreline habitat for amphibians and would improve access to the harbor for fish.

Alternative 4 - Gem Beach Channel Plan

6.06 This alternative provides for construction of breakwaters identical in configuration to those described under the recommended plan and Alternative 3, but located at the entrance to Gem Beach rather than the natural channel. Neither breakwater arm would connect to the shore. The dredged channel would consist of the following segments:

1. A channel 100-feet wide and 10-feet deep extending from approximately the 10-foot depth contour in Lake Erie to the Gem Beach channel mouth;
2. A channel 100-feet wide and 8-feet deep extending from the Gem Beach channel mouth to the Harbor Island bridge over the channel;
3. A channel 80-feet wide and 8-feet deep extending from the Harbor Island bridge approximately 2820 feet to a point near the center of the harbor, and then southerly another 4,050 feet.

This plan would require the replacement of the existing two-span, 50-foot long Harbor Island bridge with a 100-foot long single-span structure providing a 17.5-foot minimum vertical clearance above low water datum. A steel pile revetment would be constructed along the south side of the Gem Beach channel to avoid damages to private land and homes in the Harbor Island development. This alternative would produce the least amount of dredged material, both material requiring containment and material suitable for beach nourishment. The costs of this alternative are presented in Table 6.

6.07 Only one harbor entrance would be provided under this plan, which may produce unfavorable safety conditions for boaters seeking refuge during severe weather conditions. The bridge at Harbor Island would prevent entry to the harbor of all but the smallest sail-

boats, thereby limiting the local growth of sailing activities and preventing their use of the harbor for refuge.

6.08 This alternative would result in the least change in the amounts of terrestrial and aquatic habitat in the area, since the widening of the Gem Beach channel would involve developed shoreline areas and the amount of dredged material requiring containment would be smaller and thus would need a smaller containment facility. Consequently, there would be essentially no impact on terrestrial flora and minor impact on aquatic biota and terrestrial fauna.

Alternative Breakwater Configurations

6.09 Both rubblemound and steel sheet pile breakwaters were considered for this project. The rubblemound structure, because of its greater width, would require the largest amount of benthic and water column habitat. However, the rocky surfaces created by the riprap would provide valuable fish spawning areas. The riprap facing opposite to the channel entrance could eventually become covered with sand. The rubblemound structures would provide rocky areas along the flanks facing the channel mouth which should remain essentially free of sand and thus permit long-term use as fish spawning areas.

Dredged Material Disposal Alternatives

6.10 The material to be dredged from the lake channel and the natural entrance is primarily sand and as such would make excellent material for beach nourishment. The nearby public beach at East

Harbor State Park would benefit by such a plan. The park, which was once the most popular in the Ohio park system, has experienced attendance lags attributed to loss of the mile-long stretch of sandy beach. Records indicate that 800,000 swimmers used the beach in 1971 while only 240,000 used the beach in 1976. Loss of beach area began as the water level in Lake Erie rose and was accelerated by storms which washed away the sand. Beach nourishment would replace some of this sand. Suitable dredged material would be placed into the littoral system as near shore as practicable. Normal currents and wave action would stabilize the material and reestablish beach area as normal water levels return.

6.11 Several alternate sites were investigated for disposal of material which required containment (i.e., was unsuitable for use as beach nourishment). The possible use of existing federal diked disposal sites along the Lake Erie shore was explored, including sites at Toledo and Huron. The Toledo site was discarded because its location (30 miles from West Harbor) would result in uneconomical bargeing costs. Additionally, dredged materials from West Harbor would require about one-third of the disposal site capacity at Huron, thereby prohibiting the site from serving its intended purpose as a 10-year disposal site for maintenance dredging. The use of an abandoned quarry on Kelly's Island as a disposal site also proved uneconomical because of the bargeing distance.

6.12 Open lake dumping was considered at two sites suggested by the Ohio Department of Natural Resources. However, the bargeing costs were found to be excessive. Open lake dumping of the material requiring containment followed by covering with clean material also proved unsatisfactory as the amount of clean material to be dredged as part of the project would be insufficient to cover the remaining material.

6.13 Several disposal sites in the project area were investigated, as shown in Figure 8. Sites number 4, 8, and 9 are located on privately owned lands, and each is at least partially diked in. However, the likelihood of issuance of permits required for filling these areas would be questionable since each site is a marsh-like area and the preservation of wetlands is environmentally desirable.

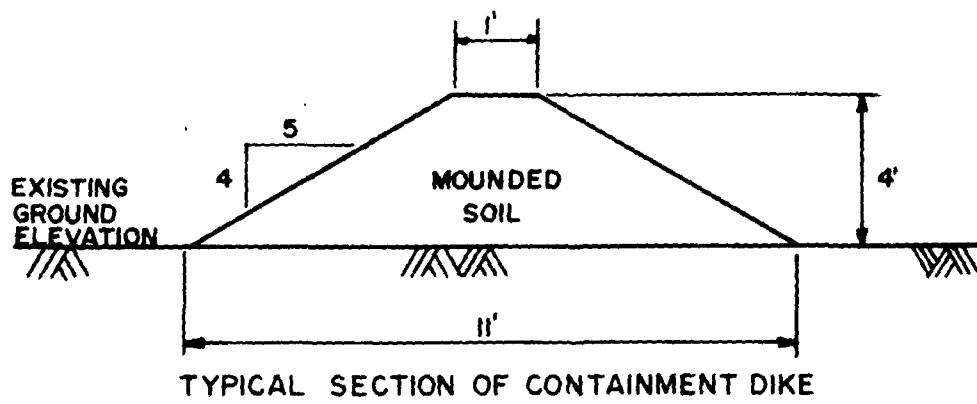
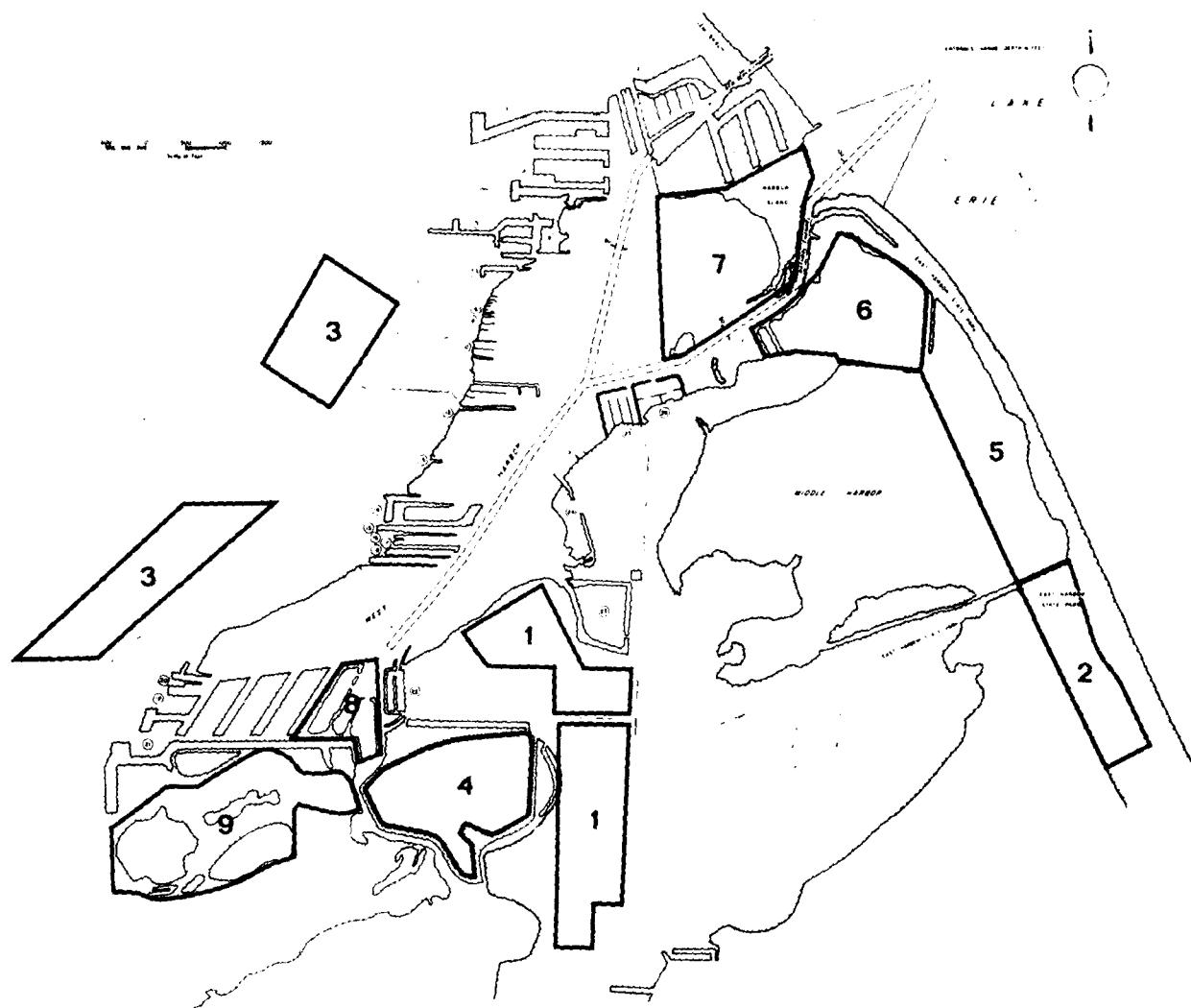
6.14 Disposal Site number 6, a former fish hatchery area within Middle Harbor, visibly supports large numbers of fish, reptiles and amphibians and was discarded for environmental reasons.

6.15 Site 7 would require a sizable dike, resulting in excessive costs and destruction of a large area of aquatic and terrestrial habitat.

6.16 The portion of Middle Harbor identified as Site 5 was previously recommended as a feasible disposal site in the draft publication of this document. Review comments voiced objections that 52 acres of aquatic habitat in a relatively untouched natural setting would be destroyed. Upland sites were strongly suggested as preferable alternatives to this site.

6.17 Sites number 1, 2, and 3 were considered in response to these review comments. Site number 3 is composed of orchard areas which might benefit from the disposal material. However, the distance is sufficiently far that excessive costs would result, making this site uneconomical.

6.18 Sites number 1 and 2 are the proposed disposal areas. Each is an upland site which would experience no long term effects or change in use as a result of receiving dredged material. Temporary earthen dikes would be constructed to confine the material. Site number 1 in Figure 4 is comprised of two areas presently used for



farming purposes. The northernmost section of this site is 42 acres in size while the southern portion of the site encompasses 55 acres. Each diked area would receive two feet of dredged material during the first year of dredging. After settlement of the suspended materials has occurred, the excess water would be drained off via weirs. During the second year of operation, the northern site would receive an additional two feet of material and would again be de-watered. No additional material would be placed on the southern site. When these areas have been sufficiently de-watered, the remaining material would be tilled into the soil and the land returned to farm usage. The dredged material would enrich the soil and benefit growth of farm crops since it has been shown to be organically rich and high in phosphorus and nitrogen.

6.19 Site number 2, 36 acres in size, is located in low-lying area formerly used as a dredged material disposal site. Approximately two feet of material would be placed at this site during the first year inside an earthen dike. The area would also be de-watered after suspended materials settle. No additional material would be placed at the site from the initial channel dredging operation; however, the site would receive dredged material from maintenance dredging planned at 5-year intervals after the initial channel dredging operation.

6.20 It is anticipated that all dredging would be accomplished by hydraulic suction-type equipment with dredged material pumped directly to the disposal sites. An archeological survey of these up-land sites has been conducted, see paragraph 2.54.

TABLE 6
COST COMPARISONS OF ALTERNATIVES

Alternative	2 NED Plan 1/	3	4 EQ Plan 1/
<u>First Costs</u>	\$	\$	\$
Channels	4,408,000	4,448,000	3,230,000
Breakwaters	1,414,000	1,414,000	1,152,000
Revetment	-	-	213,000
Bridge Replacement	-	-	125,000
Dike Disposal	98,000	98,000	98,000
Aids to Navigation 2/	<u>86,000</u>	<u>86,000</u>	<u>86,000</u>
Total First Costs	6,006,000	6,046,000	4,904,000
<u>Average Annual Costs</u>			
Interest	195,200	196,500	159,400
Amortization	49,500	49,800	40,400
Maintenance	<u>45,300</u>	<u>45,300</u>	<u>40,400</u>
Total Average Annual Costs	290,000	291,600	234,600
AVERAGE ANNUAL BENEFITS	1,206,000	1,206,000	1,150,000
RATIO OF BENEFITS TO COST	4.16 ^{3/} to 1.00	4.14 to 1.00	4.90 ^{4/} to 1.00

1/ The NED (National Economic Development) Plan is the plan which is most desirable economically. The EQ (Environmental Quality) Plan is that plan which is the most environmentally desirable. For further discussion of these plans, see the Phase I GDM.

2/ U. S. Coast Guard letter of 28 June 1977 provided an estimate of \$80,500, a figure of \$86,000 was used to reflect October 1978 price levels.

3/ Based on a 6-7/8 percent interest rate the benefit/cost ratio would be 2.55 to 1.00.

4/ This alternative, although it has the highest benefit/cost ratio, fails to meet the prescribed recreational boating navigational requirements of a harbor of refuge.

TABLE 7 SYSTEM OF ACCOUNTS
COMPARISON OF ALTERNATIVE BREAKWATER PLANS

Description	No Action	Alternative A (Steel Sheet Pile)	Alternative B (Rubblemound)
A. PLAN DESCRIPTION			
1. Structures	None.	2,350' steel sheet pile breakwater, and 295' of rubblemound	2,645' rubblemound breakwater
B. SIGNIFICANT IMPACTS			
1. Social Effects			
a. Safety	Continued wave action and shallow water deterring safe boat entry into water.	Protected entry in deep water allows for calmer water at harbor mouth. Rubblemound would tend to absorb wave action.	Protected entry in deep water allows for calmer water at harbor mouth. Rubblemound would tend to absorb wave action.
b. Shoaling	Continued severe shoaling at Harbor entrance.	Breakwater is designed and located so as to minimize shoaling.	Same as Alternative A.
c. Aesthetics	No change.	Appearance would be foreign to the natural surroundings.	Appearance would be compatible with the natural surroundings.
2. Economic Effects			
a. Total first costs	0	\$1,414,000	\$1,930,000

TABLE 7 SYSTEM OF ACCOUNTS
COMPARISON OF ALTERNATIVE BREAKWATER PLANS

Description	No Action	(Alternative A (Steel Sheet Pile))	Alternative B (Rubblemound)
b. Total Average Annual Costs	0	\$57,600	\$78,600
3. Environmental Effects			
a. Water Circulation	No change.	Calmer water near shore. Open end of north breakwater arm allows flushing within arrowhead.	Same as Alternative A.
b. Fish & Wildlife Resources	No change.	Nominal change in creating spawning areas and habitat for fish	Attractive habitat and fish spawning areas created by rubblemound construction.
c. Man Made Resources	No change.	Possible impact on water supply system to Harbor Island.	Same as Alternative A.

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)
 SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Gem Beach Channel Plan
	A. PLAN DESCRIPTION			
1. Area	Area between East Harbor State Park and Gem Beach and within West Harbor.	Area between East Harbor State Park and Harbor Island and within West Harbor.	Area between East Harbor State Park and Gem Beach channel and within West Harbor.	Area between Harbor Island and Gem Beach and within West Harbor.
2. Structures	None	2,350' steel sheet pile breakwater, 295' rubble-mound breakwater.	2,350' steel sheet pile breakwater, 295' rubble-mound breakwater.	2,350' steel sheet pile breakwater, 295' rubble-mound breakwater, 735' steel sheet pile revetment, 102' single span bridge with approaches.
3. Dredging	None	1,800' - 100 feet wide, 10 feet deep channel. 10,930' - 80 feet wide, 8 feet deep channel.	1,800' - 100 feet wide, 10 feet deep channel. 10,250' - 80 feet wide, 8 feet deep channel.	1,800' - 100 feet wide, 10 feet deep channel. 1,940' - 100 feet wide, 8 feet deep channel. 6,850' - 80 feet wide, 8 feet deep.
4. Land Use	No change	Compatible with long-range land use objectives.	Same as Alternative 2.	Same as Alternative 2.
B. SIGNIFICANT IMPACTS				
1. Social Effects				

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)
 SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Gem Beach Channel Plan
a. Community Cohesion*	No change.	Maintain and enhance community stability	Same as Alternative 2.	Same as Alternative 2.
b. Community Growth*	No change.	Increase recreational growth and related service activities	Same as Alternative 2.	Same as Alternative 2.
c. Displacement of people	No change.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
e. Noise*	No change.	Temporary construction noise. Increased level from power boats.	Same as Alternative 2.	Same as Alternative 2.
f. Recreational	Limited growth of boating activities.	Allows for sizable increase in power and sailing craft.	Same as Alternative 2.	Allows for sizable increase in power craft - restricts sailing craft.
g. Public Safety	Continued hazardous and crowded boating conditions.	Improved for boating related activities.	Same as Alternative 2.	Limited improvement in boating related activities.
2. Economic Effects				
a. Regional Growth*	Restricts potential growth.	Improves growth potential.	Same as Alternative 2.	Same as Alternative 2.

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)
 SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Gem Beach Channel Plan
b. Property Values*	No change.	Increased because of additional docking facilities and associated development.	Same as Alternative 2.	Same as Alternative 2.
c. Tax Revenue*	No change.	Increased because of higher valuations on improved properties.	Same as Alternative 2.	Same as Alternative 2.
d. Public Facilities and Services*	No change.	Increased usage of roadway, water and sanitary facilities.	Same as Alternative 2.	Same as Alternative 2.
e. Private Facilities and Services	No change.	Possible adverse effect on Harbor Island water supply.	Same as Alternative 2.	No change.
f. Employment / Labor Force*	No change.	Increase anticipated in retail and service-oriented jobs.	Same as Alternative 2.	Same as Alternative 2.
g. Business and Industrial Activity*	Continued normal activity.	Anticipated growth in retail and service-oriented activities.	Same as Alternative 2.	Growth anticipated but less than with Alternative 2.
h. Lease Income	Continued normal growth.	Increased with development of additional docking facilities.	Same as Alternative 2.	Increased with development of additional docking facilities but less than with Alt. 2.

TABLE 8 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)
SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Gem Beach Channel Plan
1. Commercial Revenue	Continued normal growth.	Increased from additional boat sales and servicing.	Same as Alternative 2.	Same as Alternative 2.
3. Environmental Effects				
a. Natural Resources*	No change.	Lake and harbor bottom will be altered by construction and dredging, but effects would be temporary and tolerable within the marine setting of the area.	Same as Alternative 2.	Same as Alternative 2.
b. Man-made Resources*	No change.	No impact anticipated.	Same as Alternative 2.	Same as Alternative 2.
c. Air-quality*	No change.	No significant adverse impact.	Same as Alternative 2.	Same as Alternative 2.
d. Water Quality	No change.	Temporary turbidity during construction	Same as Alternative 2.	Same as Alternative 2.
e. Aquatic Habitat	No change to Lake area or 1,970 acres of harbor bottom.	Temporary loss of 4% of total harbor bottom area and 6.3 acres of Lake bottom.	Temporary loss of 3.9% of total harbor bottom area and 6.3 acres of Lake bottom.	Temporary loss of 3.1% of harbor bottom and 6.3 acres of Lake bottom.

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)
 SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Gem Beach Channel Plan
f. Terrestrial Habitat	No change.	No change to existing.	Permanent loss of 2 acres of natural habitat on Harbor Island.	Same as Alternative 2.
g. Noise	No change.	Temporary construction noise. Minimal long term increase in noise from additional boats. Neither is expected to disrupt routine activities of the area.	Same as Alternative 2.	Same as Alternative 2.
C. PLAN EVALUATION				
1. Contribution to Planning Objectives	Yes.	Yes.	Yes.	Yes.
a. Enhance NED Development	No.	Yes.	Yes.	Yes.
b. Provide Harbor Refuge	Restricted to present limited usage.	Yes.	Yes.	Yes.
c. Reduce Boat Damage.	No.	Yes.	Yes.	Yes, but limited.

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)

Description	SUMMARY COMPARISON OF ALTERNATIVE PLANS			Alternative 4 Gem Beach Channel Plan
	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	
e. Encourage Investment in Larger Boats and Opportunity for Additional Boats.	Yes.	Yes.	Yes.	Yes.
2. Relationship to Four National Accounts				
a. National Economic Development Costs:				
Federal 1st. Cost	0	\$2,772,000	\$2,792,000	\$2,221,000
Non-Federal 1st. Cost	0	\$3,234,000	\$3,254,000	\$2,683,000
Total 1st. Cost	0	\$6,006,000	\$6,046,000	\$4,904,000

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)
 SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Gem Beach Channel Plan
Federal Annual Cost	0	\$ 158,000	\$ 160,400	\$ 124,000
Non-Federal Annual Cost	0	\$ 132,000	\$ 131,200	\$ 110,200
Total Annual Cost	0	\$ 290,000	\$ 291,600	\$ 234,600
Benefits:				
Recreational Boating (annual)	0	\$1,143,500	\$1,143,500	\$1,087,500
Boat Damage Reduction (annual)	0	\$ 52,500	\$ 52,500	\$ 52,500
Value as a Harbor of Refuge (Annual)	0	\$ 10,000	\$ 10,000	\$ 10,000
Transportation Cost Savings (annual)	0	No value estimated.	No value estimated.	No value estimated.

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)
 SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Gem Beach Channel Plan
Fuel Savings (annual)	0	No value estimated	No value estimated.	No value estimated.
Total Benefits (annual)	0	\$1,206,000	\$1,206,000	\$1,150,000
Net Annual Benefit		\$ 916,000	914,400	\$ 915,400
Benefit/Cost Ratio		4.16 to 1.00	4.14 to 1.00	4.90- to 1.00
b. Environmental				
Man-made Re- sources*	No change.	Allows better usage of harbor facilities	Same as Alternative 2	Same as Alternative 2.
Water Quality	No change.	No change.	No change.	No change.
Adequate Habi- tat Developed	No change.	Improved fish habitat.	Same as Alternative 2.	Same as Alternative 2.
Natural Re- sources*	No change.	No change.	No change.	No change.
Air Quality*	No change.	No appreciable change.	Same as Alternative 2.	Same as Alternative 2.

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)
 SUMMARY COMPARISON OF ALTERNATIVE PLANS

Category	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Beach Channel Plan
Aquatic Habitat (benthic)	No change.	Temporary condition during construction and recovery period.	Same as Alternative 2.	Same as Alternative 2.
Terrestrial Habitat	No change.	No change.	No change.	No change.
Turbidity	No change.	Temporary during construction.	Same as Alternative 2.	Same as Alternative 2.
Noise	No change.	Limited increase during construction. Minimal increase afterward.	Same as Alternative 2.	Same as Alternative 2.
c. Social Well-Being	Beneficial: Desirable Community Growth*	No.	Yes.	Yes.
Community Cohesion*		No.	Yes.	Yes.
Recreational	Nominal.	Significant increase.	Significant increase.	Significant increase.

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)
 SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Gem Beach Channel Plan
Aesthetics	No.	No.	No.	No.
Provide Boat Berthing	Nominal increase.	Significant increase.	Significant increase.	Significant increase.
Water-based Traffic	Nominal increase.	Significant increase.	Significant increase.	Significant increase.
Public Safety	Deteriorated.	Greatly improved.	Greatly improved.	Greatly improved.
Adverse:				
Undesirable Community Growth*	No.	No.	No.	No.
Land-based Traffic	Nominal increase.	Increase.	Increase.	Increase.
d. Regional Development				
Beneficial:				
Value of Increased Income	No change.	Increased - no estimate.	Increased - no estimate.	Increased - No estimate.

TABLE 8 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 1 of WRC Principles and Standards)
 SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 No Action Plan	Alternative 2 Natural Channel Plan	Alternative 3 Harbor Island Channel Plan	Alternative 4 Gem Beach Channel Plan
Value of Increased Employment	No change.	Increased-no estimate.	Increased - no estimate.	Increased - no estimate.
Adverse:				
Value of Income Lost	No effect.	No losses expected.	No losses expected.	No losses expected.
Quantity of Jobs Lost	No effect.	No losses expected.	No losses expected.	No losses expected.
Undesirable Growth	No.	No.	No.	No.
* Required items of Section 122, Public Law 91-611, River and Harbor Flood Control Act of 1970.				

TABLE 9 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 2 of WRC Principles and Standards)
 BENEFICIAL AND ADVERSE EFFECTS
 ALTERNATIVE 1 - NO ACTION PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
1. NATIONAL ECONOMIC DEVELOPMENT				
a. Beneficial:				
Recreational Boating (annual)	--	--	--	--
Boat Damage Reduction (annual)	--	--	--	--
Value as a Harbor of Refuge (annual)	--	--	--	--
Land Enhancement (annual)	--	--	--	--
Total NED Benefits	0	0	0	0
b. Adverse:				
Project Costs (annual)	--	--	--	--
Total NED Costs	0	0	0	0

TABLE 9 SYSTEM OF ACCOUNTS
ALTERNATIVE 1 - NO ACTION PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	"Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
2. ENVIRONMENTAL QUALITY				
a. Enhanced:				
Man-made Resources*	No change	No effect	No effect	No effect
Water Quality	No change	No effect	No effect	No effect
Aquatic Habitat Developed	No change	No effect	No effect	No effect
Terrestrial Habitat Developed	No change	No effect	No effect	No effect
b. Degraded:				
Natural Resources*	No change	No effect	No effect	No effect
Air Quality*	No change	No effect	No effect	No effect
Aquatic Habitat (benthic)	No change	No effect	No effect	No effect
Turbidity	No change	No effect	No effect	No effect
Noise	No change	No effect	No effect	No effect
3. SOCIAL WELL-BEING				
a. Beneficial:				
Desirable Community Growth*	No	No effect	No effect	No effect
Community Cohesion*	No	No effect	No effect	No effect
Recreational	None	Nominal	No effect	No effect

TABLE 9 SYSTEM OF ACCOUNTS
ALTERNATIVE 1 - NO ACTION PLAN

Impact Accounts	Within the West Harbor Area	LOCATION OF IMPACTS			Within the Rest of Nation
		Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Lake Erie	
Aesthetics	No	No effect		No effect	No effect
Provide Boat Berthing	Nominal increase	No effect		No effect	No effect
Water-based Traffic	Nominal increase	Nominal increase		No effect	No effect
Public Safety	Deteriorated	No effect		No effect	No effect
b. Adverse:					
Undesirable Community Growth*	Yes	No effect		No effect	No effect
Land-based Traffic	Nominal increase	No effect		No effect	No effect
4. REGIONAL DEVELOPMENT					
a. Beneficial:					
Value of Increased Income	No change	No change		No effect	No effect
Value of Increased Employment	No change	No change		No effect	No effect
b. Adverse:					
Value of Income Lost	No effect	No effect		No effect	No effect
Quantity of Jobs Lost	No effect	No effect		No effect	No effect
Undesirable Growth	Yes	No effect		No effect	No effect

* Required items of Section 122, Public Law 91-611, River and Harbor Flood Control Act of 1970.

TABLE 10 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 2 of WRC Principles and Standards)
BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 2 - NATURAL CHANNEL PLAN

		LOCATION OF IMPACTS		
		Within the West Harbor Area	"Island Area" of Lake Erie	Within the Lake Erie Area
				Within the Rest of Nation
1. NATIONAL ECONOMIC DEVELOPMENT				
a. Beneficial:				
Recreational Boating (annual)	\$ 1,143,500	--	--	--
Boat Damage Reduction (annual)	\$ 52,500	--	--	--
Value as a Harbor or Refuge (annual)	\$ 10,000	\$ 10,000	--	--
Total NED Benefits	\$1,206,000	\$ 10,000	0	0
b. Adverse:				
Project Costs (annual)	\$ 290,000	--	--	--
Total NED Costs	\$ 290,000	0	0	0

TABLE 10 SYSTEM OF ACCOUNTS
ALTERNATIVE 2 - NATURAL CHANNEL PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	"Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
c. Net NED Benefits:	\$916,000	10,000	0	0
2. ENVIRONMENTAL QUALITY				
a. Enhanced:				
Man-made Resources*	Allows better usage of harbor facilities.	No effect	No effect	No effect
Water Quality	No change	No effect	No effect	No effect
Aquatic Habitat Developed	Improved fish habitat	No effect	No effect	No effect
Terrestrial Habitat Developed	No effect	No effect	No effect	No effect
b. Degraded:				
Natural Resources*	No effect	No effect	No effect	No effect
Air Quality*	Somewhat, but no appreciable change	No effect	No effect	No effect
Aquatic Habitat (benthic)	Temporary condition during construction and recovery period	No effect	No effect	No effect

TABLE 10 SYSTEM OF ACCOUNTS
ALTERNATIVE 2 - NATURAL CHANNEL PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	"Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
Turbidity	Temporary during construction. Limited increase during construction. Minimal increase afterward.	No effect No effect No effect	No effect No effect No effect	No effect No effect No effect
Noise				
3. SOCIAL WELL-BEING				
a. Beneficial:				
Desirable Community Growth*	Yes	No effect	No effect	No effect
Community Cohesion*	Yes	No effect	No effect	No effect
Recreational Aesthetics	Significant No	No effect No effect	No effect No effect	No effect No effect
Provide Boat Berthing	Significant increase.	Significant increase.	Significant increase.	Significant increase.
Water-Based Traffic	Greatly improved	Improved	No effect	No effect
Public Safety				

TABLE 10 SYSTEM OF ACCOUNTS
ALTERNATIVE 2 - NATURAL CHANNEL PLAN

		LOCATION OF IMPACTS			
		Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
b. Adverse:					
Undesirable Community Growth*	No	No	No	No effect	No effect
Land-Based Traffic	Increase	No effect	No effect	No effect	No effect
4. REGIONAL DEVELOPMENT					
a. Beneficial:					
Value of Increased Income	Increased - no estimate.	Increased - no estimate.	Increased - no estimate.	No effect	No effect
Value of Increased Employment	Increased - no estimate.	Increased - no estimate.	Increased - no estimate.	No effect	No effect
b. Adverse:					
Value of Income Lost	No losses expected	No losses expected	No losses expected	No effect	No effect
Quantity of Jobs Lost	No losses expected	No losses expected	No losses expected	No effect	No effect
Undesirable Growth	No	No	No	No effect	No effect
* Required items of Section 122, Public Law 91-611, River and Harbor Flood Control Act of 1970.					

TABLE 11 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 2 of WRC Principles and Standards)
 BENEFICIAL AND ADVERSE EFFECTS
 ALTERNATIVE 3 - HARBOR ISLAND CHANNEL PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
1. NATIONAL ECONOMIC DEVELOPMENT				
a. Beneficial:				
Recreational Boating (annual)	\$1,143,500	--	--	--
Boat Damage Reduction (annual)	52,500	--	--	--
Value as a Harbor of Refuge (annual)	10,000	\$10,000	--	--
Total NED Benefit	1,206,000	\$10,000	0	0
b. Adverse:				
Project Costs (annual)	<u>291,600</u>	--	--	--
Total NED Costs	291,600	0	0	0
c. Net NED Benefits	\$ 914,400	\$10,000	0	0

TABLE 11 SYSTEM OF ACCOUNTS
ALTERNATIVE 3 - HARBOR ISLAND CHANNEL PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
2. ENVIRONMENTAL QUALITY				
a. Enhanced:				
Man-made Resources*	Allows better usage of harbor facilities.	No effect	No effect	No effect
Water Quality	No change	No effect	No effect	No effect
Aquatic Habitat Developed	Improved fish habitat.	No effect	No effect	No effect
Terrestrial Habitat Developed	No effect.	No effect	No effect	No effect
b. Degraded:				
Natural Resources*	No effect.	No effect	No effect	No effect
Air Quality*	Somewhat, but no appreciable change.	No effect	No effect	No effect
Aquatic Habitat (benthic)	Temporary condition during construction and recovery period	No effect	No effect	No effect

TABLE 11 SYSTEM OF ACCOUNTS
ALTERNATIVE 3 - HARBOR ISLAND CHANNEL PLAN

		LOCATION OF IMPACTS			
		Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
Impact Accounts					
Turbidity		Temporary during construction. Limited increase during construction Minimal increase afterward.	No effect	No effect	No effect
Noise			No effect	No effect	No effect
3. SOCIAL WELL-BEING	a. Beneficial				
	Desirable Community Growth*	Yes	No effect	No effect	No effect
	Community Cohesion*	Yes	No effect	No effect	No effect
	Recreational	Significant	Significant	No effect	No effect
	Aesthetics	No	No effect	No effect	No effect
	Provide Boat Berthing Increase.	Significant	No effect	No effect	No effect
	Water-based Traffic Increase.	Significant	Significant increase.	No effect	No effect
	Public Safety	Greatly improved	Improved	No effect	No effect

TABLE 11 SYSTEM OF ACCOUNTS
ALTERNATIVE 3 - HARBOR ISLAND CHANNEL PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
b. Adverse:				
Undesirable Community Growth*	No	No	No effect	No effect
Land-based Traffic	Increase	No effect	No effect	No effect
4. REGIONAL DEVELOPMENT				
a. Beneficial:				
Value of Increased Income	Increased - no estimate.	Increased - no estimate.	No effect	No effect
Value of Increased Employment	Increased - no estimate.	Increased - no estimate.	No effect	No effect
b. Adverse:				
Value of Income Lost	No loss expected	No loss expected.	No effect	No effect
Quantity of Jobs Lost	No losses expected	No losses expected.	No effect	No effect
Undesirable Growth	No	No	No effect	No effect
* Required items of Section 122, Public Law 91-611, River and Harbor Flood Control Act of 1970				

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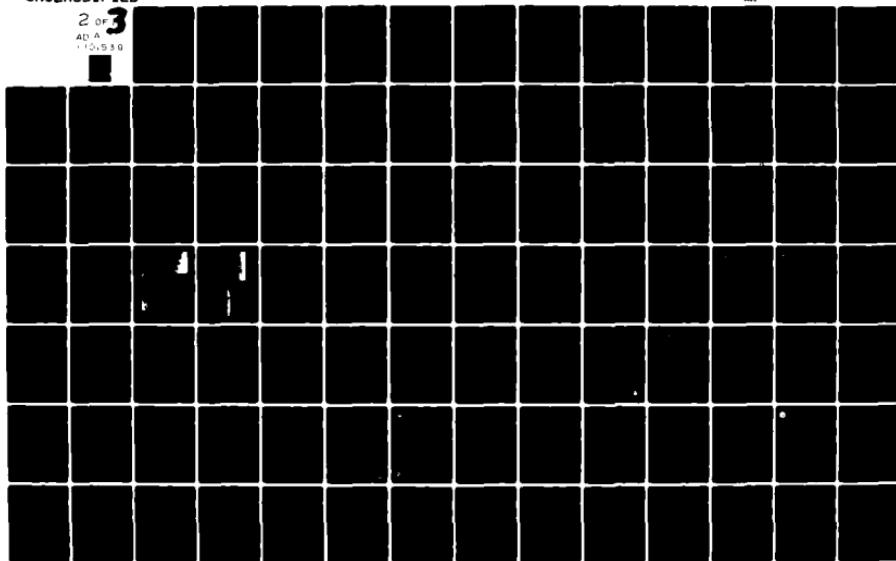


TABLE 12 SYSTEM OF ACCOUNTS
 (Consistent with requirements for Table 2 of WRC Principles and Standards)
 BENEFICIAL AND ADVERSE EFFECTS
 ALTERNATIVE 4 - GEM BEACH CHANNEL PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
1. NATIONAL ECONOMIC DEVELOPMENT				
a. Beneficial:				
Recreational Boating <small>(annual)</small>	\$1,087,500	--	--	--
Boat Damage Reduction <small>(annual)</small>	52,500	--	--	--
Value as a Harbor of <small>Refuge (annual)</small>	10,000	\$10,000	--	--
Total NED Benefits		\$1,150,000	\$10,000	0
b. Adverse:				
Project Costs (annual)	234,600	--	--	--
Total NED Costs	\$ 234,600	0	0	0
c. Net NED Benefits	\$ 915,400	\$10,000	0	0

TABLE 12 SYSTEM OF ACCOUNTS
ALTERNATIVE 4 - GEM BEACH CHANNEL PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
2. ENVIRONMENTAL QUALITY				
a. Enhanced:				
Man-made Resources*	Allows better usage of harbor facilities.	No Effect	No Effect	No effect
Water Quality	No change	No effect	No effect	No effect
Aquatic Habitat Developed	Improved habitat	No effect	No effect	No effect
Terrestrial Habitat Developed	No effect	No effect	No effect	No effect
b. Degraded:				
Natural Resources*	No effect	No effect	No effect	No effect
Air Quality*	Somewhat, but no appreciable change.	No effect	No effect	No effect
Aquatic Habitat (benthic)	Temporary condition during construction and recovery period.	No effect	No effect	No effect

TABLE 12 SYSTEM OF ACCOUNTS
ALTERNATIVE 4 - GEM BEACH CHANNEL PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
Turbidity	Temporary during construction. Limited increase during construction. Minimal increase afterward.	No effect No effect	No effect No effect	No effect No effect
Noise				
3. SOCIAL WELL-BEING				
a. Beneficial:				
Desirable Community Growth*	Yes	No effect	No effect	No effect
Community Cohesion*	Yes	Significant	No effect	No effect
Recreational	No	No effect	No effect	No effect
Aesthetic		Significant increase.	No effect	No effect
Provide Boat Berthing		Significant increase.	No effect	No effect
Water-based Traffic		Significant increase.	No effect	No effect
Public Safety	Improved	Minor	No effect	No effect
b. Adverse:				

TABLE I-2 SYSTEM OF ACCOUNTS
ALTERNATIVE 4 - GEM BEACH CHANNEL PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the West Harbor Area	Within the "Island Area" of Lake Erie	Within the Lake Erie Area	Within the Rest of Nation
Undesirable Community Growth* Land-based Traffic	No Increase	No No effect	No effect No effect	No effect No effect
4. REGIONAL DEVELOPMENT				
a. Beneficial:				
Value of Increased Income	Increased - no estimate.	Increased - no estimate.	No effect	No effect
Value of Increased Employment	Increased - no estimate.	Increased - no estimate.	No effect	No effect
b. Adverse:				
Value of Income Lost	No loss expected	No loss expected	No effect	No effect
Quantity of Jobs Lost	No loss expected	No loss expected	No effect	No effect
Undesirable Growth	No	No	No effect	No effect
				* Required items of Section 122, Public Law 91-611, River and Harbor Flood Control Act of 1970.

SECTION 7

RELATIONSHIPS BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.01 Breakwater construction and maintenance dredging at West Harbor would not only provide for the immediate recreational needs of the local residents, but would also assist in the long-term development of the recreational attributes and economy of this area. The value of Lake Erie as a unique recreational resource for the region would be increased by the facilitated access to West Harbor resulting from this project. In addition, the increasing demands for recreational facilities along Lake Erie by residents of nearby urban areas seeking weekend or vacation relief from urban conditions would be benefited in the long-term by improvements to West Harbor.

7.02 The economy of the West Harbor locale would also be enhanced in the long term by this project due to the expected influx of additional tourists and summer residents. A shift of the local economy from agricultural toward commercial activities may occur, but the resulting changes should produce a net beneficial effect on employment and the economy, and thus should stimulate long-term productivity.

SECTION 8

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IF THE PROPOSED ACTION SHOULD BE IMPLEMENTED

8.01 Construction of two steel sheet pile breakwaters would entail the essentially irreversible commitment of 954 tons of structural steel and 21,225 tons of rock. Both breakwater construction and dredging would involve irreversible and irretrievable commitments of money, manpower, and energy resources in the form of fossil fuels.

SECTION 9

PUBLIC PARTICIPATION

9.01 A Pre-Formulation Public Meeting was held on February 17, 1977 at the Catawba Island Township Hall to obtain early input from the public for use in developing the Plan of Study. The authorized project plan was reviewed and alternatives were discussed with suggestions being solicited from the public. Notices announcing the meeting were sent to all known concerned parties and various news media. Approximately 225 people were in attendance and voiced strong support for immediate action.

9.02 A series of memos have been sent out periodically to keep the public advised of the ongoing progress of the study and to solicit suggestions whenever they might be appropriate.

9.03 A second Formulation Public Meeting was held November 21, 1977 to review comments on the Draft Environmental Statement and its accompanying document, the Draft Phase I General Design Memorandum. A Digest of Proceedings of the Public Meetings is included in Appendix C. Additional meetings or workshops may be convened upon request by boating groups, environmental interests or other organized establishments.

9.04 During the studies for West Harbor, Ohio, compliance with Section 404 was met by consideration of Section 404(b)(1) guidelines. The Section 404 Evaluation is included in Appendix G. Coordination with the public was accomplished through a public notice, also included in Appendix G, and distribution of the draft EIS. A Section 401 Certificate, dated May 24, 1979, was received from the State of Ohio.

SECTION 10
COMMENTS AND RESPONSES

FEDERAL AGENCIES

A. U.S. Department of the Interior (Regional Office)

1. Comment: We have reviewed the draft environmental statement for Recreational Navigation Improvements, West Harbor, Ottawa County, Ohio, and find that it is inadequate in its assessment of the environmental impacts which may result from the disposal of polluted dredge materials into aquatic environments. Generally the impacts are stated for the recommended plan as outlined in House Document 88-245, dated March 16, 1964, but better environmental solutions are available for the disposal of the polluted materials. References to figures and tables are not correctly labelled and lead to confusion in interpreting the overall plans and alternatives.

Response: Discrepancies in references to tables and figures have been corrected. Subsequent to your review of the EIS, a meeting with the Fish and Wildlife Service, EPA and the Ohio DNR, was held. At this meeting, upland disposal sites for the polluted dredge materials were discussed. Three upland sites were recommended. These sites are now part of the project plan. There are no in-water disposal sites for polluted dredge materials.

2. Comment: On December 10, 1976, the Bureau of Outdoor Recreation responded to a request from Mr. P. McCallister of the Army Corps of Engineers, Detroit District, for early coordination regarding the Phase I General Design Memorandum investigations for this project. We find that the issues raised concerning East Harbor State Park and a possible 6(f) conflict have not been addressed. Based upon the description of the project contained in the draft statement, we have determined that the project will affect fast-lands and submerged properties that have been acquired with assistance from the Land and Water Conservation Fund (Projects 39-00007, 39-00008, 39-00232, 39-00295, and 39-00300). Section 6(f) of the Land and Water Conservation Fund Act of 1965, as amended, reads:

"No property acquired or developed with assistance under this section shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location."

We again request that the Army Corps of Engineers consult with the Ohio Department of Natural Resources to ensure compliance with Section 6(f). The conversion of Section 6(f) properties to other than public outdoor recreation uses is subject to approval by the Secretary of the Interior. A determination of conversion is required and should be submitted to the Bureau of Outdoor Recreation by the Ohio Department of Natural Resources.

Response: The major land areas affected by this project are the disposal sites which will receive dredged material found to be unsuitable for open lake disposal. The upland sites now proposed are located on nearby private farm land, and on land within East Harbor State Park. The latter site has formerly been used as a dredged material disposal site and was not purchased with any assistance from the Land and Water Conservation Fund. The deposition of additional dredged material at this site would not alter the potential uses of this land for recreational purposes nor change its present use.

3. Comment: Page 14, paragraph 2.24 states that no specific surveys of fish species have been conducted within West, Middle or East Harbors. We feel that regional lists of representative fish species (or fauna or flora) should not be used for specific projects. Sampling should be done within the project area whenever possible to ensure species and type habitats are not destroyed

in such projects as dredging or constructing confined disposal facilities. As a result of sampling by the Fish and Wildlife Service within West Harbor during April and May 1977, many of the species you listed in Table 2E, page E-6 were captured. We also found the following five additional species: longnose gar, bluegill, green sunfish, pumpkinseed, and spotfin shiner.

Response: Data in Table E-2, Appendix E, were the most site-specific available at the time and were provided by personnel of the U.S. Fish and Wildlife Service, Sandusky Biological Station. The additional species found during your April-May, 1977 survey have been added to the table.

4. Comment: Page 15, paragraph 2.25 states that spawning sites have not been specifically identified in the West Harbor vicinity. FWS personnel from East Lansing observed large numbers of spawning carp moving into Middle Harbor through a breached dike during April and May 1977. They also observed large numbers of carp spawning in the old commercial fisherman channel south and east of the mouth of the natural channel at West Harbor. Spawning sites should be accurately identified in Middle Harbor before any habitat is destroyed by confined spoils disposal as planned.

Response: Carp were observed to use Middle Harbor as a spawning area; however, Middle Harbor is no longer being considered for use as part of this project and no impacts on the fish community of this harbor are expected to occur.

5. Comment: Page 18, paragraph 2.32 indicates the possibility of the spotted turtle (endangered in Ohio) occurring in the West Harbor area. Many turtles have been observed by Fish and Wildlife Service personnel in Middle Harbor and before any action is taken to destroy habitat in Middle Harbor through construction of a

confined disposal facility, a thorough analysis of the status of this turtle at any project site should be examined.

Response: Since Middle Harbor is no longer being considered as a possible disposal site for dredged materials, no adverse impacts are anticipated on any spotted turtle population that may exist in the area. The upland disposal sites under consideration would not likely provide suitable habitat for this species.

6. Comment: Page 19, paragraph 2.34 states that Middle Harbor has remained essentially in its natural state in spite of the recreational and residential development of East and West Harbors and has been identified as an area of ecological significance and a prime sanctuary for waterfowl and wildlife. More information is needed on what effects the filling of 38-52 acres of this aquatic habitat would have on the overall quality of the existing sanctuary.

Response: The filling of any areas in Middle Harbor is no longer under consideration as part of this project.

7. Comment: Page 36, paragraph 4.10, states that the vertical steel walls used to construct the breakwaters would provide an area for attachment of eggs for some fish species such as yellow perch. This is not correct. Any yellow perch eggs which might become attached to the steel wall would be accidental and not by design. Vertical steel walls provide little, if any, nesting habitat for any Great Lakes fish species.

Response: Your correction has been noted and the text changed accordingly.

8. Comment: Section 4.26 (page 40) does not describe the probable impacts of the proposed project on recreational opportunities within East Harbor State Park. This should be expanded to include a discussion of how recreational fishing and boating within Middle

Harbor would be affected by the deposition of heavily polluted dredge materials.

Response: As previously stated, Middle Harbor is no longer under consideration as a potential dredged material disposal site. With regard to East Harbor State Park, the proposed project would expand recreational opportunities in that the clean sand dredged near the mouth of the natural channel entrance to West Harbor would be deposited offshore of the barrier beach at East Harbor State Park for beach nourishment, thus stabilizing the shoreline for the future use of park visitors.

9. Comment: Page 41, paragraph 4.27, states that no archeological sites are known to exist within the project area. It should be recognized that the proposal to remove 26,000 square feet of terrestrial habitat (paragraph 4.13) has potential to encounter such resources. The statement should reflect procedures to be followed should previously unknown archeological resources be encountered during project development.

Response: An archeological survey was performed in the summer of 1978 at all upland areas considered for disposal sites which will be impacted by the proposed project. This was fully coordinated with the Ohio Historical Society, the responsible state historic preservation office in Ohio. A statement has been added (4.42) should archeological resources be encountered.

10. Comment: Page 44, paragraph 4.35, indicates that the first choice for disposal of the highly phosphoric dredge material is along the shoreline inside Middle Harbor, possibly for the creation of a marsh. Two questions which should be considered prior to any disposal are the possible effects on the spotted turtle and any fish spawning sites which might occur within the proposed 52-acre fill site. There may be no need to build a wetland at

this site as it already exists as a useful shallow body of water remaining in its natural state. As stated on page 19, paragraph 2.34, Middle Harbor has been identified as an area of ecological significance and a prime sanctuary for waterfowl and wildlife. These values need to be considered before 52 acres of Middle Harbor is filled. Perhaps the dredge materials could be placed at an upland site and used as a fertilizer or soil conditioner. Also, deposition of materials in the Middle Harbor area conflicts with the master plan for East Harbor State Park which states Middle Harbor is to remain in its natural state.

Response: As stated previously, Middle Harbor is no longer under consideration as a potential disposal site for dredged materials. Upland sites as suggested would be used.

11. Comment: The 1,400-foot extension of the authorized channel as depicted in Figure 7, page 48, should be discussed as an alternative in the text. It also raises the question as to whether all total disposal figures used in the EIS include the materials which would result from this additional dredging.

Response: The 1,400-foot channel extension is not an alternative but rather an update of the original plan of improvement for West Harbor as presented in House Document 88-245, dated March 16, 1964. The purpose of the present Phase I General Design Memorandum is to review the original plan of improvement to determine if the project still meets the needs, concerns and constraints of the affected parties. The extension of the channel has been proposed to serve the extensive development which has occurred at the southern shoreline of West Harbor since the original plan was developed and approved in 1962. The additional dredged material which would result from this channel extension has been included in the total quantity and cost figures presented in this report.

12. Comment: The discussion on the use of riprap near the channel entrance on page 51, paragraph 6.09, fifth sentence, tends to be misleading. We do not anticipate the sand would cover the riprap for many years, and thus the negative impacts would be minimal. The sixth sentence in the paragraph should be rewritten to reduce confusion between positive fish spawning factors which favor rubblemound structures as opposed to the use of steel pilings.

Response: In the text it was stated that the riprap would eventually become covered with sand. At this point, estimates of the time required for this to occur are purely speculative. However, the paragraph has been reworded to reduce confusion.

B. U.S. Environmental Protection Agency (Regional Office)

1. Comment: We have completed our review of the Draft Environmental Impact Statement (EIS) for Recreational and Navigational Improvements at West Harbor, Ohio. The project involves the construction of breakwaters, an 1,800 foot entrance channel, and 10,930 feet of inner channel. Approximately 80 acres of lake bottomland and 26,000 square feet of terrestrial habitat will be removed by the project. We have environmental reservations on the proposed project's water quality effects and wetland impacts. Furthermore, we believe additional information is required in the EIS to evaluate the environmental effects of the proposed action adequately.

Response: Additional information has been added to the text, including changes in recommendations for dredged material disposal alternatives. Please see the specific comments addressed below.

2. Comment: In general, we have serious concerns about the use of Site 1 in Middle Harbor or any water site as a disposal site

for dredged material from West Harbor. The U.S. Environmental Protection Agency (USEPA) believes that the use of upland sites for disposal should be given the greatest priority. We note that "...Mr. George Roose, owner of the farmland located between East Harbor and West Harbor, has given verbal approval for deposition of dredged material on his property." Additional USEPA concerns involve the project's economic justification; the interpretation of our July 27, 1977, letter; land and shoreline development; secondary water quality effects; the tradeoffs of a single channel concept versus a double channel concept; and the water quality effects of various dredging and disposal alternatives. Our attached, detailed comments generally correspond to the topic headings in the EIS.

Response: Since your review of the draft EIS, it has been determined that an upland disposal site would provide a feasible disposal alternative with the least adverse impacts on environmental factors in the area. Upland sites are now recommended. Specific comments on the ramifications of this disposal alternative are discussed below.

3. Comment: In accordance with USEPA's directives, we have classified our comments on this project as ER, environmental reservations, and have rated the EIS as 2, additional information necessary. The date and classification of our comments will be published in the Federal Register.

Response: Additional information has been provided since your review. Please see specific comments addressed below.

4. Comment: The EIS should indicate that a disposal site for the dredged material will be required. In addition, any present or future plans by the project sponsors to develop this harbor for recreation should be described in detail. The location and extent

of additional State marina facilities to accommodate the expected increase in boats should be discussed, as should the other project benefits.

Response: Upland disposal sites, as now recommended, are described on page 55, paragraph 6.18. West Harbor is predominantly privately owned. The State has no additional plans for developing this area for recreation. The Ohio Department of Natural Resources is presently installing new docks at the State marina facilities within the harbor to replace the existing deteriorated docks. However, these plans do not include expansion of the State-owned facilities. Project benefits are described in Section 4 and quantified in Appendix D.

5. Comment: We note that the benefits were derived primarily by estimating the annual return boat owners would receive from the project if their boats were used for hire. Reduction in boat damage, the harbor's value as a harbor of refuge, and fishing benefits only account for 4.2 percent, .8 percent and 5 percent respectively, of the total average annual benefits. The remaining 90 percent is attributed to boat rental benefits. According to Table D-4, approximately 53 percent of the total average annual benefits is attributed to new boats, additional transient boats or boats transferred to West Harbor after project improvements. Without knowing the breakdown of benefits assigned to boat damage reduction, refuge and fishing, the benefits for future boat traffic could be even higher than 53 percent.

Response: Of the total benefits, including benefits attributable to boat damage reduction, and harbor of refuge, the percentage of benefits going to new boats, additional transient boats, or boats transferred to West Harbor after improvements, is approximately 54 percent. Projections of future recreational boat traffic in the West Harbor area were derived from discussions with local marina owners and use of forecasts prepared by the Great Lakes Basin Commission. These projections are considered very accurate, although conservative. Naturally, if higher projections were used new boat traffic would have captured a greater share of the benefits. It should be noted however, that for the proposed project, even the assumption

of no-growth (i.e. no increase in recreational craft using the harbor) would still produce a benefit/cost ratio greater than one. A more detailed breakdown of the benefits can be found on table D-4 in Appendix D.

6. Comment: While it is not within our Agency's authority to require justifications of the project's economic feasibility, it appears much more appropriate to determine benefits on the basis of existing needs and numbers of boats and/or boat slips in West Harbor. To assume benefits for what appears to be an increase of over 100 percent in the number of boats within West Harbor may not be realistic or possible, in view of the current Federal policies and trends to deter unnecessary and undesirable secondary development in and along our Nation's waters. In addition, while marinas and boat slips in some areas of a harbor may be desirable, their proliferation along an entire shoreline is definitely undesirable from a water quality standpoint. (See discussion below of Water and Sanitary Facilities.)

Response: Development of project benefits within the West Harbor area is based upon anticipated growth that has been determined from, among other things, past trends and interviews with existing marina operators. The economic analysis considers that one-half of the growth for inboard craft would occur within the first ten years of the 50-year project life and the remainder developing over the following 40 years. Outboards and sailboats are expected to increase uniformly over the 50-year project life. Control of future growth at West Harbor would be regulated by a public body. This would be in accordance with item "d" of the local assurances presented in the

Phase I Report which specifies that local interests, prior to construction, would be required to provide assurance that they would "Establish a competent and properly constituted public body empowered to cooperate financially and regulate the use, growth, and free development of the harbor facilities with the understanding that such facilities will be open to all on equal terms." The Ohio Environmental Protection Agency, the Ottawa County Board of Health and the local zoning board jointly administer jurisdiction over development in the West Harbor area. Secondary development would proceed in a controlled manner, subject to requirements mandated by laws and regulations of the State of Ohio which are intended to control the impacts of growth and development on water quality. The shoreline of West Harbor, excluding that belonging to East Harbor State Park, has been zoned primarily for commercial/recreational uses, so that any secondary development resulting from the proposed project would produce no major changes in development patterns or current land uses.

7. Comment: The cost/benefit ratio of 5.07 to 1.00 assumes the construction of the "preferred" disposal site, Site 1, for the creation of 52 acres of marshland along the East Harbor Park barrier beach in Middle Harbor. The EIS should show a recomputed benefit/cost ratio with a more up-to-date interest rate for each of the alternatives, using disposal sites which were generally accepted by all present at the November 4, 1977, meeting.

Response: This has been done; please see Table 6, page 58. An interest rate of 3-1/4 percent was agreed upon by the Ohio Department of Natural Resources on December 2, 1969, when it certified its willingness to assure the requirements of local cooperation in this project. Benefit/cost ratios appearing in this report reflect both this interest rate and, for comparative purposes, the present interest rate of 6-5/8 percent wherever appropriate.

8. Comment: In view of the concern shown at the meeting about current loss of life and boat damage problems, we believe that the EIS should contain a section discussing them in detail.

Response: Additional information has been added (See page 28, paragraph 2.53 and U.S. Coast Guard correspondence, page B-25).

9. Comment: In Section 2.17, the shoreward side of the barrier beach at East Harbor State Park is described as a "lowlying marsh-land bordering Middle Harbor." The area is said on page 44 to have no marsh except for a narrow fringe of emergents along the shoreline. Since there was some confusion at the November 4 meeting as to whether this area was marshland, the EIS requires clarification. We believe the shallow water area at Site 1 is a shallow water wetland, whether emergents exist or not. The potential for this area to become more naturally biopродuctive over time and as a function of lake levels should be described. The role that benthic fauna play at this area and the water quality benefits of this type of wetland should also be mentioned.

Response: There were no emergent plants along the Middle Harbor shoreline during the growing season of 1977. However, wetland vegetation does exist in the drier shoreline area. This area however, is no longer under consideration as part of the project.

10. Comment: According to Section 4.01, it appears that littoral drift will be affected by the proposed arrowhead breakwater. If the basis of a stable shoreline at West Harbor is the transport of littoral drift in approximately equal quantities in both directions, the effect of altering this natural movement should be explained. The long-term effects upon Gem beach and the barrier beach should be discussed in more detail. Beach nourishment practices that are planned for these areas should be described.

Response: Littoral drift is primarily from southeast to north-west. The sand which has eroded from the barrier beach has been deposited primarily in the natural channel. Sand would tend to build up east of the southeast breakwater, stabilizing and enlarging the barrier beach. No littoral deposit or starvation is expected to beaches northwest of Gem Beach.

11. Comment: Section 2.39 in the EIS on sediment quality is based on a misquote from our July 27, 1977 letter. Furthermore, phosphorus was not the only parameter used by USEPA to determine the sediment's pollutional classification. The other parameters that exceeded our sediment guidelines were total volatile solids, COD, TKN and, in one instance each, lead and nickel.

Response: The quote has been corrected. As indicated in your comment, phosphorus was not the only pollutant exceeding guidelines. In your letter dated July 27, 1977 (page B-22) it was indicated that the sediments contained "high concentrations of nutrients, particularly phosphorus, and high oxygen demanding material." The text has been revised to indicate your determinations more completely.

12. Comment: According to the EIS, shallow private wells are the principal source of drinking water on Catawba Island. From our conversations with the Ohio EPA, drinking water quality problems exist on Catawba Island because the wells and the septic tanks are in shallow and permeable glacial deposits and dolomitic bedrock. The EIS should discuss the extent of these problems and what measures the State and county health authorities are implementing to correct them.

Response: Mr. John Baughman, Chief Sanitarian for the Ottawa County Board of Health, indicated that the contamination of drinking water supplies has resulted primarily from inadequate treatment systems installed for older cottages many years ago. He indicated that generally 25 percent of the water wells tested by the Board of

Health may exhibit quality problems due to these older treatment systems. Permits for new water and septic systems are given by the Ottawa Health Department after review by the Ohio EPA. A water supply system which involves hooking up to the Port Clinton system is anticipated in 1 or 2 years.

13. Comment: The EIS indicates that plans are being made to extend Port Clinton's water supply distribution system to Catawba Island by 1979 or early 1980. The likelihood that these plans will be implemented and the source and status of funding should be discussed in the EIS. If Harbor Island decides not to connect or is unable to connect to the proposed distribution system, and the breakwater configuration adversely affects the quality or flow rate of Harbor Island's intake water, the EIS should explain what actions will be done to correct these problems and the party responsible for these corrections.

Response: Engineering plans are completed for the extension of a drinking water supply system to Catawba Island. The Ohio Environmental Protection Agency has determined that such a system should be installed to guarantee that potable water quality standards are met. One million dollars will come from HUD for construction. Additional money is expected from U.S.D.A. loans (Farmers Home Admin.) and local assessment. Another study is being made to form a water district for all of Danbury Township. Assurances for local cooperation include provisions to mitigate adverse impacts on water quality at Harbor Island should these occur. If Harbor Island does not connect to planned water supply system and the intake water is adversely affected, the local sponsor will be responsible for correction. For details of sources of potable water in the West Harbor area and the possible impact of the proposed project on these water supplies, please see Section 2, paragraphs 2.46 and 2.47 and Section 4, paragraph 4.30.

14. Comment: The EIS should explain whether old trailer and cottage developments are being required by health authorities to construct package plants to eliminate the problem of ground water contamination. It is our understanding that all new trailer and cottage developments require treatment by small package plants. The degree of treatment afforded by these plants and their general effect upon West Harbor waters and sediments should be described. Any problem of septic tank leachates and bacteriological or viral contaminants entering West Harbor that may be shown by existing water quality data within West Harbor and Lake Erie should be discussed.

Response: Old trailer and cottage developments are not required to construct new package plants. However, all new substantial trailer and cottage developments are required by the Ottawa Health Department to put in small package plants. Individual development must meet local and State requirements. The Ottawa Health Department with assistance from the Ohio EPA analyzes these permit applications. Both the Ottawa County Department of Health and the Ohio EPA were contacted and neither knew of any water quality problems within the harbor due to septic tank leachates. Water quality was analyzed by the Federal EPA in 1977 and it was determined that no serious water quality problems exist. There are no known fecal coliform data available from West Harbor. See Table E-7, Appendix E.

15. Comment: Even though planning for adequate wastewater treatment facilities is in progress, and a 208 plan for the Toledo Metropolitan Area Council of Governments is being prepared, the increased use of West Harbor and related secondary private development could cause an increase in pollutants in the harbor. The area presently uses on-site treatment systems for waste disposal. Ottawa County has made application to USEPA for a Step 2 construction grant for design of a wastewater treatment system to serve Danbury Township, including East Harbor State Park. Additionally, Catawba Island is Number 212 on the Ohio Municipal Project List for a Step 1 construction grant and therefore should be funded

within the next year. Regionalization of Catawba Island with the proposed Danbury Township facilities will probably be one of the alternatives considered in the preparation of a facilities plan for Catawba Island.

Response: Regulatory authority exists at local and state levels which can control secondary development by granting or denying permits for construction of on-site sewage treatment systems or, alternatively, for hook-up to an existing sewer system. Such regulations forbid any development which would contaminate the waters of the State of Ohio. Thus any unplanned development which would produce wastes beyond the handling capacity of any existing sewage treatment system could be prevented from occurring if such wastes would degrade the quality of Ohio's waters.

16. Comment: The description of marine sanitary facilities service and treatment in the area (on page 26) should be expanded and sufficient information should be included so the reader can determine whether increased use by recreational boaters will aggravate water pollution problems in the harbor.

Response: Additional information has been added (See page 43, paragraph 4.32).

17. Comment: We note that the dredging of the recommended channel would remove 26,000 square feet of terrestrial habitat, including a small island. It should be indicated whether any bird rookeries or roosting areas exist on this island or other islands in the harbor.

Response: Mr. Steve Bennett, assistant naturalist at East Harbor State Park, was contacted on this question. He stated that he was familiar with the islands and that no nesting areas or bird rookeries exist on these islands at present and that to the best of his knowledge none existed on them in the past.

18. Comment: Section 4.33 indicates that most new development would be immediately along the shoreline in the form of additional docking facilities and marinas. The zoning map for Catawba Island Township (Figure 5) designates shoreline areas adjacent to West Harbor as recreational/commercial land use. The extent and timing of development of these areas with and without the project should be discussed. The potential water quality effects of further development in and around this harbor have to be addressed in the EIS. It would seem appropriate to determine the extent of development and additional boat traffic that could occur in West Harbor and still maintain applicable water quality standards. The EIS should describe in general the various nonpoint and point discharges in West Harbor and Middle Harbor and their overall effect upon water quality and sediment quality. Ohio EPA should be contacted for assistance on determining the assimilative capacity of the harbor and the extent of boat traffic that the harbor will handle without degrading water quality.

Response: As noted previously, West Harbor is predominantly privately owned. The extent and timing of development with and without the project is speculative. Indiscriminant development without adherence to State and local regulations could adversely impact on the West Harbor water quality. However, all development must meet the zoning requirements and have plans acceptable to the Ottawa County Health Department and the Ohio EPA for sewage and water installation. No water quality problems are anticipated if State and local regulations are followed. There are no known point or non-point discharges in West Harbor or Middle Harbor. It is likely that some agricultural and residential runoff contributes to the overall sediment and water quality of West Harbor. Water quality testing by EPA indicated that no serious water quality problems exist. Sediment quality within West Harbor reflects the accumulation of en-

riched material for long periods of years. It is likely that agricultural runoff is the major contributor. Ohio EPA was contacted and they do not know what the assimilative capacity of the harbor is. With the regular use of military and power boat facilities, the water quality in the harbor is not expected to degrade significantly with the anticipated increase in boat traffic.

19. Comment: The comment from local authorities to control development of the shoreline is necessary, particularly if such development would result in the degradation of water quality in West Harbor.

Response: As stated previously, the Ottawa County Board of Health and the Ohio Environmental Protection Agency have regulatory mandates to limit growth and development which would degrade Ohio's waters.

20. Comment: Sections 4.35 and 5.01 of the EIS imply that the material from the interior of West Harbor "would be suitable for harbor disposal" without confinement. This implication is based on the July 27, 1977, letter from Mr. Timm of USEPA, that stated that the material does not need to be isolated from the aquatic environment and suggested that the construction of a disposal site within West Harbor itself would be both economical and environmentally least objectionable.

Since additional information on the project has been made available and the fact that upland disposal sites exist, we have determined that a water site may be neither economical nor environmentally least objectionable. In most cases, water sites are the most environmentally objectionable. The use of upland sites should be given the greatest priority. Before and during the November 4, 1977 meeting, Mr. Robert L. Kay indicated the possibility of using agricultural fields and other upland properties adjacent to Buck Road for dredged disposal. Wetlands creation would be generally acceptable in an area that was biologically sterile and did not have any natural potential to improve water quality and/or become biologically significant.

The statement in the letter that "...isolating the material from the aquatic environment is not required" was made because of the general absence of toxic substances and bioaccumulative materials in the harbor sediments. It does not mean that we would necessarily condone noncontainment, dumping, side casting, and marsh creation with the dredged sediments inside West Harbor, Middle Harbor or East Harbor, or in any open waters or wetlands other than Lake Erie. However, these sediments are of such a quality that they do not have to be completely and permanently isolated from the aquatic environment within impermeable dikes. The chemical constituents or materials from the dredged sediments could be allowed over time to enter the inner harbors in such quantities that they could be assimilated into the aquatic ecosystem.

Response: As indicated previously, Middle Harbor is no longer under consideration as a potential dredged material disposal site. Upland sites were chosen with approval by your agency, the Fish and Wildlife Service and the Ohio DNR.

21. Comment: The statement is made in section 6.08 of the EIS that the Gem Beach Channel Plan "...would result in the least change in the amounts of terrestrial and aquatic habitat in the area..." The EIS indicates that because a lesser amount of dredging and a smaller containment facility would be required, there "...would be essentially no impact on terrestrial fauna and flora and minor impact on aquatic biota."

Reasons for proposing an additional entrance in lieu of improving the existing entrance to handle boat traffic should be explained. The difference in dredging and disposal requirements should be discussed. It should be explained why two entrances are essential for boating safety and why one large entrance channel, using the existing boat channel, is not more favorable from an environmental and economic standpoint. The issues related to restricted sailboat use of the harbor and reduction in fish benefits should be related to the total costs of the project and the cost/benefit

ratio. The small amount of additional fishing and recreation benefits that are obtained for East Harbor State Park from the implementation of the preferred alternative should be compared to the environmental tradeoffs of additional dredging, disposal. significant adverse terrestrial and aquatic impacts. The Gem Beach Channel Plan does not appear to require such tradeoffs.

Response: The Gem Beach Channel Plan has been designated the Environmental Quality Plan. Please see Table 12, page 83 for further discussion. The improvement of the Gem Beach Channel in itself would not provide sufficient capacity to significantly prevent delays to boats seeking refuge in the harbor during storms. It would still be necessary for boats to form queues awaiting entry to the harbor via this channel. An additional entrance to West Harbor would eliminate this problem. An additional problem with the Gem Beach Channel is that sailboats are prohibited entry via this channel due to the low clearance under the bridge at the harbor end of the channel. This prevents West Harbor from meeting the harbor of refuge requirement of providing safe refuge for all vessels commonly plying the waters of Lake Erie. To purchase the right of way and enlarge the bridge would make the plan economically not feasible.

22. Comment: The EIS should provide a description of the different dredging and disposal alternatives and their respective water quality effects. For example, the use of a pipeline dredge with barges for hauling the dredged material to a disposal site could result in significant overflows from the barge in order to make an economic load. Much of the phosphorus that is associated with the fine clay particles in the dredged sediments could be resuspended and released to West Harbor and Lake Erie. In addition, pipeline dredging will result in considerable quantities of water that may have to be discharged back to the harbor. The retention time and the quality of the waters discharged from the disposal area are extremely important and should be taken into consideration in the design of the containment facility. Consideration should be given to the use of dredging equipment that has the design or operational capability to minimize turbidity during dredging operations. The

possible use of a clamshell with an hydraulic closure attainment, the Mud Cat technology, silt curtains around the dredge operation (if currents do not prohibit), and other dredging methods should be considered.

Response: Due to the shallow water depths in the project area, only shallow-draft hydraulic suction dredges would be used. Dredged material would be pumped through pipelines directly from the dredging area to the disposal site without barging, eliminating the requirement for spilling excess water overboard to make an economical load. Turbidity produced by hydraulic dredging would be substantially less than would occur with mechanical dredging techniques, and would be short-term in nature since the quieter waters of the harbor would permit rapid resettlement of suspended particles. Silt curtains have been used at open water disposal areas, but all disposal sites at West Harbor are inland. Silt curtains around the moving dredge (and in currents) would not be useful. The proposed deeper channel would reduce the resuspension of sediments in the long run which would otherwise result from the prop wash of heavy boat traffic occurring in existing shallow waters. Based on the size of the disposal sites, it is estimated that retention time to be one to two weeks. This would allow resettlement of most suspended particles.

23. Comment: Some of the unpolluted sand material from the harbor could be used in the construction of dikes and horizontal sand blanket drains for an upland containment area. Preparation of the disposal site with horizontal and vertical sand and gravel drains would not only accelerate the drainage of the containment area and the consolidation of the dredged spoil area, but would also provide a more stable base for dike construction. These drainage methods as well as other dewatering techniques could increase the storage capacity of the upland site and reduce the time period that the upland area would be put out of use.

Response: All clean sands dredged as part of this project would be used for beach nourishment along the shoreline of Fast Harbor State Park. The weir would dewater the sites after a retention time of one to two weeks. The dredged material in the agricultural fields would be tilled into the soil speeding up the dewatering process. Sand is not suitable for dike construction because of erosion problems. The third site in East Harbor State Park is composed of sand and gravel, which as you stated, could accelerate drainage.

24. Comment: With regard to the alternative disposal sites designated in the EIS to contain the sediment classified as polluted, upland Site 5 appears to be the most acceptable. If this site were unable to contain all the material, other upland sites should be considered, such as the agricultural fields. Consideration should also be given to drying the material in an upland site and then removing it, to increase the site's capacity.

Response: The disposal site previously identified as Site Number 5 and now listed as Site Number 2 was adopted as one of the recommended disposal sites subsequent to your review of the draft EIS. Sufficient capacity has been obtained without having to dry and remove the material.

25. Comment: We understand that the owner of Site 3 intends to develop the area into a trailer park. If the owner has a Corps permit and it is inevitable that the area will be filled, we believe consideration should be given to placing some of the dredged material at this site.

Response: The owner of Site 3 (now identified as 8) does not at present have a Corps of Engineers permit to fill.

C. National Oceanic and Atmospheric Administration - National Ocean Survey

1. Comment: Geodetic control survey monuments may be located in the vicinity of the proposed disposal sites. If there is any

planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments.

Response: Your comment has been noted. Compliance with procedures set forth by N.O.A.A. shall take place at the appropriate time to locate and safeguard any affected monuments. At present, no monuments are known to exist in the immediate area of the recommended disposal sites.

D. National Oceanic and Atmospheric Administration - Great Lakes Environmental Research Laboratory

1. Comment: The proposed construction of West Harbor breakwaters and dredging of navigation channels will greatly improve the utility and safety of the harbor. Short-term reduction of water quality by construction activities should be acceptable.

The two steel pile breakwaters will intercept the littoral drift passing the harbor site in both directions. As a result, some sand accumulation can be expected at the breakwaters. Further away from breakwaters, erosion of shoreline will increase. Particularly exposed to erosion will be the shoreline some 2,000 - 3,000 feet east of the harbor. Disposal of clean sand should be used to protect the exposed shoreline.

Response: Clean sand dredged from the natural channel entrance to West Harbor will be deposited offshore of the beach at East Harbor State Park to provide beach nourishment for this area.

E. Advisory Council on Historic Preservation

1. Comment: Thank you for your request of September 6, 1977, for comments on the environmental statement for recreational navigation improvements in West Harbor, Ohio. Pursuant to Section 102(2)(C) of

the National Environmental Policy Act of 1969 and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800), we have determined that your draft environmental statement appears adequate concerning our area of interest, and we have no further comments.

Response: Your comment is noted.

F. Federal Power Commission - Regional Office

1. Comment: Since the project apparently would pose no major obstacle to the construction and operation of bulk electric power facilities including potential hydroelectric developments and natural gas pipeline facilities, we have no comments on the Draft EIS.

Response: Your comment is noted.

G. U.S. Coast Guard

1. Comment: This office has reviewed the referenced statement and we encourage dredging of the natural channel entrance to provide improved access to West Harbor. High boating density in the entrance to the Gem Beach Channel has contributed significantly to the incidence of severe collision accidents. Moreover, underwater obstructions, made more hazardous by decreasing Lake levels, have been the cause for vessel damage in the Gem Beach Channel, the only entrance to West Harbor.

Response: Your comments are noted. The problems of present harbor navigability is discussed in Section G, Alternative 1.

STATE AGENCIES

A. Ohio Department of Natural Resources

1. Comment: There is no question of the need for navigational improvements at West Harbor which has perhaps the largest concentration of recreational boating on Lake Erie. As lake levels continue to decline from the exceptionally high levels of recent years, the depth of West Harbor has decreased to approximately three to four feet. Increased recreational opportunities for boaters and a harbor of refuge for small craft would be provided with implementation of this project. Particularly notable is improved boater safety. The very rapid changes in weather conditions characteristic of Lake Erie often create hazardous conditions at West Harbor when many boaters seek refuge from severe weather conditions. The Draft Environmental Impact Statement could have described the problems and dangers to recreational boating in the project area in greater detail, but the authorization of the proposed improvements speaks for the need for this project. This Department supports the recommended plan described in paragraph 1.05 of the environmental statement. It should result in the greatest and fairest public benefit.

Response: Your comments have been noted. Additional information on boating accidents has been added to the text; please see page 28, paragraph 2.53.

2. Comment: Several important elements of the draft environmental statement require additional information so that the project's effects can be better evaluated. Additional data and analysis in the following areas will expedite the final design and implementation of the project and will also insure that unquantified

environmental values are given appropriate consideration in decision making along with economic and technical considerations:

1. Identification of major long-term effects and irreversible commitments of resources;
2. Description of the project area environment;
3. Relationship to land use plans and other projects in the area, and to appropriate governmental policy; and
4. Current state-of-the-art technology in dredging and dredged material disposition.

Response: Additional information has been added to the text per your comments; additional information is also provided below.

3. Comment: Besides the provision of navigation improvements and future increased recreational opportunities, the proposed action involves another major commitment of resources: the disposition of approximately 562,600 cubic yards of dredged material high in organics and phosphorus.

Paragraph 2.39, page 20, makes reference to the U.S. EPA preliminary determination that the sediments are unsuitable for open lake disposal. The U.S. EPA in the July 27, 1977 letter listed in Appendix B indicated that sediment samples located in the main portion of West Harbor contained a high concentration of phosphorus, with "significant" phosphorus releases from samples in the elutriate test. The stated "basic strategy" of the U.S. EPA for the protection and improvement of Lake Erie is phosphorus removal: "The transfer of high concentrations of nutrients, particularly phosphorus, and high oxygen demanding material to Lake Erie is clearly undesirable." However, confirmation of the reported phosphorus values, a detailed enumeration of sediment background nutrient levels, and comparison to conditions in Western Lake Erie should provide relativity on the pollution potential of West Harbor

sediments. Data may demonstrate, for instance, that the goal of protecting Lake Erie may be achieved by open lake disposal of West Harbor dredging.

In the ongoing Lake Erie Wastewater Management Study (LEWMS), the U.S. EPA used a computer-based mathematical model to determine the relationship between pollutant loads and in-lake water quality. It was found that regeneration of pollutants from lake bottom sediments is not a major source of pollution.

The Ohio Department of Natural Resources has specific recommendations for the method and location of open-lake disposal, which is in fact the first recommendation of this Department for disposal of sediments from within West Harbor. Open lake disposal should not be rejected as an alternative based simply on sediment analysis data. It is hoped that the U.S. Army Corps of Engineers will reassess dredge spoil alternatives based on the following:

1. The most accurate prediction of phosphorus releases to lake waters from each of the alternative disposal methods based on current scientific knowledge. It is noted that the U.S. EPA has already determined that because West Harbor sediments do not contain significant concentrations of toxic or bio-accumulative materials, that "isolating the material from the aquatic environment is not required." ¹
2. To protect the aquatic resources of the project area environment the first choice for spoil deposition is an upland site. An open lake site is considered the next best alternative because it minimizes the loss and alteration of critical water habitat (an acceptable location for open lake deposition in the western basin should be determined from an investigation of current research data). Diked disposal sites are the least desirable alternative because of the loss of aquatic/wetland habitat, which is a critical resource in the project area.
3. Consideration of technically feasible mitigative measures for open lake disposal with state-of-the-art

¹ U.S. EPA Region V letter, July 27, 1977, DEIS, p. B-22.

technology (i.e.: Oxygenation of dredged material slurry during disposal to reduce immediate oxygen demand to a tolerable level during disposal; pump-down technique for discharging material almost directly on lake bottom; and selecting optimum site for deposition).

4. Most current data on the effects of open lake disposal and confined disposal based on the results of dredged materials research.

Again, as with the evaluation criteria developed for the EPA/COE on the discharge of dredged material into ocean waters, the evaluation of potential for environmental impact of dredged material disposal should emphasize biological effects, rather than simple chemical presence of contaminants.

Compliance with the Water Resources Development Act of 1976 (P.L. 94-587) cannot be achieved without reference to or use of research results from the Dredged Material Research Program (DMRP). The biological and water-sediment quality effects of open-water disposal of dredged material are being evaluated under the Environmental Impacts and Criteria Development Project by the DMRP in Task 1A: Aquatic Disposal Field Investigations. Results from the Ashtabula, Ohio Field Study (Work Unit 1A08) are applicable to this project. Current research under the DMRP's Task 6B: Treatment of Contaminated Dredge Material, may also be helpful in determining the feasibility of alternative actions and mitigative measures for dredge disposal. Recent findings from the Buffalo District's Lake Erie Wastewater Management Study (LEWMS) should also be considered.

It is noted that the consideration of alternatives for dredge disposal requires that each site be evaluated on its own particular characteristics. The Corps of Engineers should supply additional information critical to the EPA's opposition or support of the alternative disposal plans:

1. Existing and potential quality and use of the water in the disposal areas;
2. Other factors, such as depth and current at the disposal sites;
3. Time of year of disposal;
4. Likely recurrence of disposal in the receiving area;
5. Disposal methods alternatives; and
6. Predicted long and short term effects on receiving water quality.

It is suspected that when considering the total ecological impact of each of the alternatives including no action, open lake disposal of the inner West Harbor sediments performed with appropriate mitigative measures may be the most suitable disposal alternative.

Response: As stated in your comments, upland disposal sites are more desirable than open water disposal. As discussed at the meeting on November 4, 1977, the environmental effects of this alternative would be less, and, in addition, the dredged material would act as a soil conditioner, thus making use of a valuable resource, as mentioned in your comments. Upland sites are recommended.

4. Comment: The description of the project area environment should be expanded in the final environmental statement. Some clarification is necessary also. A reassessment of the use patterns at East Harbor State Park and future plans for recreational development of the park by this Department has determined that additional land base at Site 1 is not needed or desirable.

Response: Additional information on the project area has been added to Section 2, paragraph 2.25, 2.48, 2.52 and 2.53. Subsequent to your review of the draft EIS, it was concluded that Site 1 (Middle Harbor) should not be considered further as a potential dredged material disposal site.

5. Comment: Middle Harbor is described as being located adjacent to East Harbor State Park in paragraphs 2.07 and 4.35. The description of East Harbor State Park should be revised to include the entire Middle Harbor and the state-owned lands on Harbor Island and submerged lands in West Harbor.

Response: Revisions have been made per your comments.

6. Comment: Other federal projects in the area, paragraph 3.07, should include the proposed marina improvements at East Harbor State Park. The Ohio Department of Natural Resources is awaiting final approval of a Land and Water Conservation Fund application to improve docks at this facility. The state-owned lands described in the previous paragraph were acquired with federal assistance through the Land and Water Conservation Fund Act Program.

Response: Paragraph 3.07 has been revised to reflect improvements at the State marina on West Harbor. The proposed project will not affect lands purchased with assistance from the Land and Water Conservation Fund Act.

7. Comment: The project area environment is a critical resource area. Ohio DNR critical resource areas policies should provide some general guidance for selection of the final project plan. "It is the policy of the Department to preserve, protect and where desirable, to restore the resources of the Lake Erie Coastal Zone for the enjoyment of the current and succeeding generations."¹ The proposed channel improvements, breakwater construction at the harbor entrance, and maintenance dredging are in conformance with the ODNR policy. Plans to provide a walkway and handrail for sport fishing on the south breakwater is a particularly notable attempt to utilize the lake resource for the enjoyment of current and future generations.

¹Critical Resource Areas ODNR Policy, 1977.

Response: The proposed plans have been coordinated with and developed in cooperation with the Ohio Department of Natural Resources. Fishing benefits have been deleted from the project based on the concerns of U. S. Fish and Wildlife as stated in their letter of 20 July 1978, enclosed in Appendix B.

8. Comment: The use of the approximately 127,900 cubic yards of dredged material composed of clean sands for beach nourishment along the barrier beach facing Lake Erie is in conformance with Department policy which strenuously opposes the removal of sediments from the littoral system. However, plans should be developed and the EIS should state specifically, that this material will be used for beach nourishment at the East Harbor beach.

Response: The EIS has been revised to indicate that clean dredged materials will be used for beach nourishment at East Harbor State Park. See Recommended Plan, paragraph 1.05.

9. Comment: The Ohio DNR considers this project to have the highest priority in the area for recreational boating. The Department is committed to assist in the non-federal assurances for the project and will cooperate in every possible to ensure its completion at the earliest possible date.

Response: Your comment has been noted.

10. Comment: Reference should be made in the Draft EIS to appropriate data from the Dredged Material Research Program so that state-of-the-art technology and current knowledge on effects of dredge disposal may be used in comparing possible alternatives for disposal. The following report, prepared for the Division of Wildlife, should also be investigated and referenced: The Fishing Potential, Special Management Areas, and Their Interaction with Dredge Spoil Sites in Lake Erie, by Suzanne M. Hartley and Allen R. Van Vooren.

Response: As per the 4 November 1977 meeting, open water disposal sites are no longer being considered. Both the EPA and Fish and Wildlife Service as well as your agency agreed that upland sites, as now planned, would be preferable.

11. Comment: Data on the flora of the project area could be expanded. The Ohio Biological Survey and the Ohio Natural Heritage Program inventory may be useful sources of information, especially in regard to the existence of rare or threatened species. The following publication should be investigated and referenced:

Changes in the Marsh and Aquatic Vascular Flora of East Harbor State Park, Ottawa County, Ohio, Since 1985,
David L. Moore, Ohio Journal of Science 76 (2): 78, 1976.

Response: The referenced publication has been consulted. Information extracted from this article has been incorporated in Table E-3, Appendix E, of the EIS.

12. Comment: Was the elutriate test on West Harbor sediment samples conducted at a specific dissolved oxygen level? Might test results differ from expected releases of phosphorus resulting from open lake disposal?

Response: The standard elutriate test is not performed at a specific dissolved oxygen level per se. The dredged sediment sample and water from the sampling site are thoroughly mixed as part of the test to simulate conditions during open water disposal of this material. Test results may differ slightly from expected releases of phosphorus if disposal operations are performed during a different season of the year than when samples were collected. However, the elutriate test simulates, as closely as possible in the laboratory the actual conditions which would occur during open water disposal and it is expected that releases of phosphorus would be similar.

13. Comment: Because West Harbor sediments do not contain significant concentrations of toxic or bioaccumulative materials, the U.S. EPA has determined that "isolating the material from the aquatic environment is not required." Will there be runoff from a confined disposal site? Based on current knowledge from dredged material research, what is the likelihood of phosphates being released to lake waters from a confined disposal site?

Response: Dredged material would be placed in confined disposal sites and allowed to settle for perhaps 2 or more weeks. Since nearly all of the phosphorous is adsorbed to fine particles, allowing the material to settle would effectively remove it from the overflow water. Little if any phosphorous is expected to be released back to the lake water.

INTEREST GROUPS AND CITIZENS

A. Lake Erie Advisory Committee

1. Comment: The Lake Erie Advisory Committee appreciates the opportunity to provide comments on the Draft Environmental Statement (DES) for recreational navigation improvements at West Harbor, Ohio. We concur in the need for these improvements and specifically endorse Site 1 for disposal of dredged materials.

The concept of creating backbarrier marshes by restoring eroded or diminished barrier beaches is consistent with our belief that the negative impact on Lake Erie marshes by high water and fills can be reversed. Site 1 as detailed in Section 5 of the DES conforms to our philosophy of backbarrier marsh restoration. Backbarrier marshes are a natural phenomenon along the west and south shores of Lake Erie. It matters little who or what provides the barrier, nature or man. The wetlands behind such barriers thrive and are tremendously productive. Their development should be encouraged wherever possible to help increase the overall inventory of marshes along our coastline. We will never have more marshes landward of the high water mark because of roads, bulkheads, agricultural pursuits, and in general all manner of development. Therefore, if we are to increase the inventory of viable wetlands, they must be carved out of the extensive shoalwaters of Lake Erie. In this way we can learn to use the unique "seiche" feature of Lake Erie to enhance biological productivity to counter the trends of urban monoculture. There are many places along the shoreline where viable marsh communities can be created or restored in this fashion with the use of dredge materials in a suitable container. Clean organic materials dredged from navigation channels can be used to enrich marsh areas as well. A careful study of the existing

disposal sites acting as barriers should be conducted to see if marshes do restore themselves and a total program for marsh regeneration should be conceived for the entire western basin of Lake Erie.

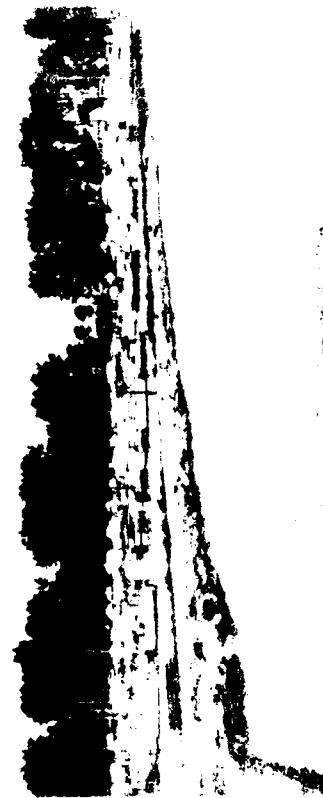
Response: Disposal Site 1, is no longer under consideration as part of this project. However, plans to use clean dredged sand for beach nourishment along the lakeward edge of the barrier beach at East Harbor State Park would stabilize this area and protect wetland areas which form the landward side of the beach. A barrier disposal dike, as you suggested, is being constructed at Point Mouillee, Michigan. Where possible, marsh protection and/or restoration is considered a viable disposal alternative.



View of shoreline near natural channel entrance showing the devastating impact on shoreline trees.



Typical recreational boating facilities along southeast shoreline of West Harbor



View from Harbor Island bridge, looking northeast toward Gem Beach Marina



View from Harbor Island bridge looking southwest toward inner West Harbor

REFERENCES

- (1) Ottawa Regional Planning Commission: Comprehensive Regional Development Plan 1970-1995, Volume 2. Prepared by Finkbeiner, Pettis & Strout, Ltd., Toledo, Ohio, 1971.
- (2) Baum, J.V., Tierney, J.M. and Sticksel, P.R.: "Climatological and Environmental Factors that Influence Survival on the Great Lakes". Department of Transportation, U.S. Coast Guard, Office of Research and Development Report No. CG-D-11-74, Washington, D.C., June, 1973.
- (3) Ohio Department of Natural Resources, Division of Geological Survey: "Generalized Geologic Section of Rocks in Ohio". Information Circular No. 4, Columbus, Ohio, 1943.
- (4) Hartley, Robert P.: "Bottom Sediments in the Island Area of Lake Erie". Ohio Department of Natural Resources, Division of Shore Erosion, Technical Report No. 9, Columbus, Ohio, 1961.
- (5) Sparling, Dale R.: "Anomalous Drainage Pattern and Coastal Tilting in Ottawa County and Vicinity, Ohio". Ohio Journal of Science 67 (6): 378-381, 1967.
- (6) Flesher, E.C.: "A General Soil Map of Ottawa County, Ohio". Ohio Department of Natural Resources, Division of Lands and Soil, Columbus, Ohio, 1974.
- (7) U.S. Department of the Interior, Federal Water Pollution Control Administration: Lake Erie Environmental Summary 1963-1964. May, 1968.

(8) Ohio Department of Natural Resources, Division of Geological Survey: "Preliminary Estimate of Erosion or Accretion Along the Ohio Shore of Lake Erie and Critical Erosion Areas". Technical Report No. 8. Columbus, Ohio, 1961.

(9) Carter, Charles H.: "Natural and Man-Made Features Affecting the Ohio Shore of Lake Erie". Guidebook No. 1. Ohio Department of Natural Resources, Division of Geological Survey, Columbus, Ohio, 1973.

(10) Pincus, Howard J.: "The Motion of Sediment Along the South Shore of Lake Erie". In Johnson, J.W. (Ed.): Proceedings of the Fourth Conference on Coastal Engineering. Council on Wave Research, The Engineering Foundation, 1954.

(11) U.S. Army Corps of Engineers: "Lake Erie Shore Line From the Michigan - Ohio State Line to Marblehead, Ohio, Beach Erosion Control Study". U.S. 87th Congress, 1st Session, House Document No. 63, 1961.

(12) Brinkhurst, R.D.: "Changes in the Benthos of Lakes Erie and Ontario". In Sweeney, R.A. (Ed.): Proceedings of the Conference on Changes in the Biota of Lakes Erie and Ontario. Bull. Buffalo Soc. Natural Sciences 25 (1): 45-65, 1969.

(13) Personal communication, U.S. Fish and Wildlife Service, Sandusky, Ohio, May 4, 1977.

(14) Personal communication, Ohio Department of Natural Resources, Division of Wildlife, Columbus, Ohio, June 7, 1977.

(15) Personal communication, Ohio Department of Natural Resources, Division of Wildlife, Findlay, Ohio, June 9, 1977.

(16) Ohio Department of Natural Resources, Division of Wildlife: "Endangered Wild Animals in Ohio". May 1, 1976.

(17) Information provided by Ohio Department of Natural Resources, Division of Parks and Recreation personnel, East Harbor State Park.

(18) Great Lakes Basin Framework Study, Appendix 17: Wildlife. Wildlife Work Group, Great Lakes Basin Commission, Ann Arbor, Michigan, 1975.

(19) Personal communication, U.S.E.P.A. District Office, Fairview Park, Ohio, March 14, 1977.

(20) Ohio Environmental Protection Agency Regulation AP-3, "Particulate Matter and Sulfur Oxide Standards". Adopted January 28, 1972.

(21) Personal communication, Ohio Environmental Protection Agency, Northwest District Office, Bowling Green, Ohio, April 21, 1977.

(22) U.S. Army Corps of Engineers: Lake Erie Wastewater Management Study Preliminary Feasibility Report - Volume II, Appendix A, "Water Quality Inventory". Buffalo, New York, December, 1975.

(23) Cooper, C.L. and Herdendorf, Charles E.: "Resources of the Lake Erie Island Region". Ohio Department of Natural Resources, Division of Water, Coastal Zone Management Section, Columbus, Ohio, May, 1977.

(24) Personal communication, Ohio Historical Society, Columbus, Ohio, April 5, 1977. See also correspondence dated November 29, 1977 in Appendix B.

(25) Ottawa County Regional Planning Commission: Ottawa County Comprehensive Planning Program, Volume 1 - Population and Economic Study. Prepared by Finkbeiner, Pettis & Strout, Ltd., Toledo, Ohio, 1971.

(26) Catawba Island Township Board of Trustees, Zoning Commission: Catawba Island Township Zoning Resolution. Adopted 1965, Revised 1974.

(27) Ottawa Regional Planning Commission: Ottawa County Recreation and Open Space Plan 1975-1995. Port Clinton, Ohio, August, 1976.

(28) Conant, Roger: The Reptiles of Ohio. University of Notre Dame Press, Notre Dame, Indiana, 1951.

(29) Personal communication, Ohio Department of Natural Resources, Columbus, Ohio, July 7, 1977.

(30) Endangered and Threatened Wildlife and Plants, U.S. Dept. of the Interior, Fish and Wildlife Service. Federal Register, 16 June 1976 and 14 July 1977.

(31) Hartley, Suzanne M. and Van Vooren, Allan R.: The Fishing Potentials, Special Management Areas, and Their Interaction with Dredge Spoil Sites in Lake Erie. Draft report prepared for the Ohio Department of Natural Resources, Division of Wildlife, Columbus, Ohio, 1977.

APPENDIX A

**LETTERS RECEIVED ON THE
DRAFT ENVIRONMENTAL STATEMENT**

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

December 7, 1977

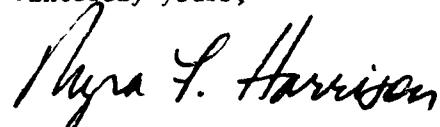
Mr. McCallister
Engineering Division
Department of the Army
Detroit District
P. O. Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

Thank you for your request of September 6, 1977, for comments on the environmental statement for recreational navigation improvements in West Harbor, Ohio. Pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969 and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R Part 800), we have determined that your draft environmental statement appears adequate concerning our area of interest, and we have no further comments.

Thank you for your cooperation.

Sincerely yours,



Myra F. Harrison
Assistant Director
Office of Review
and Compliance

A-1

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

FEDERAL POWER COMMISSION
REGIONAL OFFICE

Federal Building, Room 3130
230 South Dearborn Street
Chicago, Illinois 60604

September 12, 1977

Department of the Army
Detroit District, Corps of Engineers
Box 1027
Detroit, Michigan 48231
Attn: Environmental Resources Branch,
Engineering Division

Gentlemen:

We have reviewed the Draft Environmental Impact Statement dated August, 1977, for the West Harbor, Ohio, Recreational Navigation Improvements, furnished us with P. McCallister's letter of August 31, 1977. Our comments are requested.

Comments of this office are made in accordance with the National Environmental Policy Act of 1969 and the August 1, 1973 Guidelines of the Council on Environmental Quality. Our principal concern with developments affecting land and water resources is the possible effect of such developments on bulk electric power facilities including potential hydroelectric developments and on natural gas pipeline facilities.

Since the above noted proposed project apparently would pose no major obstacle to the construction and operation of such facilities, we have no comments on the Draft EIS.

The foregoing statements are of this office and, therefore, do not necessarily represent the views of the Federal Power Commission.

Thank you for the opportunity to comment on the Draft Environmental Statement.

Very truly yours,

Bernard D. Murphy
Bernard D. Murphy
Regional Engineer



**DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD**

Address reply to:
COMMANDER (mep)
Ninth Coast Guard District
1240 East 9th St.
Cleveland, Ohio 44199
Phone: FTS 293-3919

T6475
5 October 1977

*Department of the Army
Detroit District, Corps of Engineers
Attn: Mr. F. McCallister
P.O. Box 1027
Detroit, MI 48231

Re: Draft Environmental Statement
West Harbor, Ohio Recreational
Navigation Improvements

Dear Mr. McCallister:

This office has reviewed the referenced statement and we encourage dredging of the natural channel entrance to provide improved access to West Harbor. High boating density in the entrance to the Gem Beach Channel has contributed significantly to the incidence of severe collision accidents. Moreover, underwater obstructions, made more hazardous by decreasing Lake levels, have been the cause for vessel damage in the Gem Beach Channel, the only entrance to West Harbor.

J. A. Wilson
Captain, U. S. Coast Guard
Chief, Marine Safety Division
By direction of the Commander,
Ninth Coast Guard District



United States Department of the Interior

OFFICE OF THE SECRETARY
NORTH CENTRAL REGION
7510 DEMPSTER STREET
DES PLAINES, ILLINOIS 60016

ER-77/843

Colonel Melvyn D. Remus
District Engineer
U. S. Army Engineer District
P. O. Box 1027
Detroit, Michigan 48231

Dear Colonel Remus:

We have reviewed the draft environmental statement for Recreational Navigation Improvements, West Harbor, Ottawa County, Ohio, and find that it is inadequate in its assessment of the environmental impacts which may result from the disposal of polluted dredge materials into aquatic environments. Generally the impacts are stated for the recommended plan as outlined in House Document 88-245, dated March 16, 1964, but better environmental solutions are available for the disposal of the polluted materials. References to figures and tables are not correctly labelled and lead to confusion in interpreting the overall plans and alternatives.

On December 10, 1976, the Bureau of Outdoor Recreation responded to a request from Mr. P. McCallister of the Army Corps of Engineers, Detroit District, for early coordination regarding the Phase I General Design Memorandum investigations for this project. We find that the issues raised concerning East Harbor State Park and a possible 6(f) conflict have not been addressed. Based upon the description of the project contained in the draft statement, we have determined that the project will affect fastlands and submerged properties that have been acquired with assistance from the Land and Water Conservation Fund (Projects 39-00007, 39-00008, 39-00282, 39-00295, and 39-00300). Section 6(f) of the Land and Water Conservation Fund Act of 1965, as amended, reads:

"No property acquired or developed with assistance under this section shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location."

We again request that the Army Corps of Engineers consult with the Ohio Department of Natural Resources to ensure compliance with Section 6(f). The conversion of Section 6(f) properties to other than public outdoor recreation uses is subject to approval by the Secretary of the Interior. A determination of conversion is required and should be submitted to the Bureau of Outdoor Recreation by the Ohio Department of Natural Resources.

SPECIFIC COMMENTS

Fish

Page 14, paragraph 2.24 states that no specific surveys of fish species have been conducted within West, Middle or East Harbors. We feel that regional lists of representative fish species (or fauna or flora) should not be used for specific projects. Sampling should be done within the project area whenever possible to ensure species and type habitats are not destroyed in such projects as dredging or constructing confined disposal facilities. As a result of sampling by the Fish and Wildlife Service within West Harbor during April and May 1977, many of the species you listed in Table 2E, page E-6 were captured. We also found the following five additional species: longnose gar, bluegill, green sunfish, pumpkinseed, and spotfin shiner.

Page 15, paragraph 2.25 states that spawning sites have not been specifically identified in the West Harbor vicinity. FWS personnel from East Lansing observed large numbers of spawning carp moving into Middle Harbor through a breached dike during April and May 1977. They also observed large numbers of carp spawning in the old commercial fisherman channel south and east of the mouth of the natural channel at West Harbor. Spawning sites should be accurately identified in Middle Harbor before any habitat is destroyed by confined spoils disposal as planned.

Reptiles

Page 18, paragraph 2.32 indicates the possibility of the spotted turtle (endangered in Ohio) occurring in the West Harbor area. Many turtles have been observed by Fish and Wildlife Service personnel in Middle Harbor and before any action is taken to destroy habitat in Middle Harbor through construction of a confined disposal facility, a thorough analysis of the status of this turtle at any project site should be examined.

Birds

Page 19, paragraph 2.34 states that Middle Harbor has remained essentially in its natural state in spite of the recreational and residential development of East and West Harbors and has been identified as an area of ecological significance and a prime sanctuary for waterfowl and wildlife. More information is needed on what effects the filling of 38-52 acres of this aquatic habitat would have on the overall quality of the existing sanctuary.

Bio Aquatic CommunityFish

Page 36, paragraph 4.10, states that the vertical steel walls used to construct the breakwaters would provide an area for attachment of eggs for some fish species such as yellow perch. This is not correct. Any yellow perch eggs which might become attached to the steel wall would be accidental and not by design. Vertical steel walls provide little, if any, nesting habitat for any Great Lakes fish species.

Recreation

Section 4.26 (page 40) does not describe the probable impacts of the proposed project on recreational opportunities within East Harbor State Park. This should be expanded to include a discussion of how recreational fishing and boating within Middle Harbor would be affected by the deposition of heavily polluted dredge materials.

Historic and Archeological resources

Page 41, paragraph 4.27, states that no archeological sites are known to exist within the project area. It should be recognized that the proposal to remove 26,000 square feet of terrestrial habitat (paragraph 4.13) has potential to encounter such resources. The statement should reflect procedures to be followed should previously unknown archeological resources be encountered during project development.

Dredge Disposal

Page 44, paragraph 4.35, indicates that the first choice for disposal of the highly phosphoric dredge material is along the shoreline inside Middle Harbor, possibly for the creation of a marsh. Two questions which should be considered prior to any disposal are the possible effects on the spotted turtle and any fish spawning sites which might occur within the proposed 52-acre fill site. There may be no need to build a wetland at this site as it already exists as a useful shallow body of water remaining in its natural state. As stated on page 19, paragraph 2.34, Middle Harbor has been identified as an area of ecological significance and a prime sanctuary for waterfowl and wildlife. These values need to be considered before 52 acres of Middle Harbor is filled. Perhaps the dredge materials could be placed at an upland site and used as a fertilizer or soil conditioner. Also, deposition of materials in the Middle Harbor area conflicts with the master plan for East Harbor State Park which states Middle Harbor is to remain in its natural state.

Figure 7 Alternative Plans

The 1400-foot extension of the authorized channel as depicted in figure 7, page 48, should be discussed as an alternative in the text. It also raises the question as to whether all total disposal figures used in the EIS include the materials which would result from this additional dredging.

Alternative Breakwater Configurations

The discussion on the use of riprap near the channel entrance on page 51, paragraph 6.09, fifth sentence, tends to be misleading. We do not anticipate the sand would cover the riprap for many years, and thus the negative impacts would be minimal. The sixth sentence in the paragraph should be rewritten to reduce confusion between positive fish spawning factors which favor rubble mound structures as opposed to the use of steel pilings.

Sincerely yours,



David L. Jervis
Regional Environmental Officer



UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN ST
CHICAGO ILLINOIS 60604

Mr. P. McCallister
Chief, Engineering Division
U.S. Army Corps of Engineers, Detroit
P. O. Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

We have completed our review of the Draft Environmental Impact Statement (EIS) for Recreational and Navigation Improvements at West Harbor, Ohio. The project involves the construction of breakwaters, an 1800 foot entrance channel, and 10,930 feet of inner channel. Approximately 80 acres of lake bottomland and 26,000 square feet of terrestrial habitat will be removed by the project. We have environmental reservations on the proposed project's water quality effects and wetland impacts. Furthermore, we believe additional information is required in the EIS to evaluate the environmental effects of the proposed action adequately.

In general, we have serious concerns about the use of Site 1 in Middle Harbor or any water site as a disposal site for dredged material from West Harbor. The U.S. Environmental Protection Agency (USEPA) believes that the use of upland sites for disposal should be given the greatest priority. We note that "...Mr. George Roose, owner of the farmland located between East Harbor and West Harbor, has given verbal approval for deposition of dredged material on his property." Additional USEPA concerns involve the project's economic justification; the interpretation of our July 27, 1977, letter; land and shoreline development; secondary water quality effects; the tradeoffs of a single channel concept versus a double channel concept; and the water quality effects of various dredging and disposal alternatives. Our attached, detailed comments generally correspond to the topic headings in the EIS.

In accordance with USEPA's directives, we have classified our comments on this project as ER, environmental reservations, and have rated the EIS as 2, additional information necessary. The date and classification of our comments will be published in the Federal Register.

We appreciate the opportunity to review this Draft EIS. Should you have any questions regarding our comments, please call Mr. Robert Kay at 312-353-2307.

Sincerely,

[Signature] 10

Susan P. Walker, Chief
Environmental Impact Review Staff
Office of Federal Activities

Attachment .

U.S. ENVIRONMENTAL PROTECTION AGENCY'S (USEPA) DETAILED COMMENTS ON THE DRAFT
ENVIRONMENTAL IMPACT STATEMENT FOR WEST HARBOR

Recommended Plan

The EIS should indicate that a disposal site for the dredged material will be required. In addition, any present or future plans by the project sponsors to develop this harbor for recreation should be described in detail. The location and extent of additional State marina facilities to accommodate the expected increase in boats should be discussed, as should the other project benefits.

Project Benefits and Costs

We note that the benefits were derived primarily by estimating the annual return boat owners would receive from the project if their boats were used for hire. Reduction in boat damage, the harbor's value as a harbor of refuge, and fishing benefits only account for 4.2 percent, .8 percent and 5 percent respectively, of the total average annual benefits. The remaining 90 percent is attributed to boat rental benefits. According to Table D-4, approximately 53 percent of the total average annual benefits is attributed to new boats, additional transient boats or boats transferred to West Harbor after project improvements. Without knowing the breakdown of benefits assigned to boat damage reduction, refuge and fishing, the benefits for future boat traffic could be even higher than 53 percent.

While it is not within our Agency's authority to require justifications of the project's economic feasibility, it appears much more appropriate to determine benefits on the basis of existing needs and numbers of boats and/or boat slips in West Harbor. To assume benefits for what appears to be an increase of over 100 percent in the number of boats within West Harbor may not be realistic or possible, in view of the current Federal policies and trends to deter unnecessary and undesirable secondary development in and along our Nation's waters. In addition, while marinas and boat slips in some areas of a harbor may be desirable, their proliferation along an entire shoreline is definitely undesirable from a water quality standpoint. (See discussion below of Water and Sanitary Facilities.)

The cost-benefit ratio of 5.07 to 1.00 assumes the construction of the "preferred" disposal site, Site 1, for the creation of 52 acres of marsh-land along the East Harbor Park barrier beach in Middle Harbor. The EIS should show a recomputed benefit-cost ratio with a more up-to-date interest rate for each of the alternatives, using disposal sites which were generally accepted by all present at the November 4, 1977, meeting.

In view of the concern shown at the meeting about current loss of life and boat damage problems, we believe that the EIS should contain a section discussing them in detail.

Shoreline Processes, Hydrology and Littoral Processes

In Section 2.17, the shoreward side of the barrier beach at East Harbor State Park is described as a "lowlying marshland bordering Middle Harbor." The area is said on page 44 to have no marsh except for a narrow fringe of emergents along the shoreline. Since there was some confusion at the November 4 meeting as to whether this area was marshland, the EIS requires clarification. We believe the shallow water area at Site 1 is a shallow water wetland, whether emergents exist or not. The potential for this area to become more naturally bioprotective over time and as a function of lake levels should be described. The role that benthic fauna play at this area and the water quality benefits of this type of wetland should also be mentioned.

According to Section 4.01, it appears that littoral drift will be affected by the proposed arrowhead breakwater. If the basis of a stable shoreline at West Harbor is the transport of littoral drift in approximately equal quantities in both directions, the effect of altering this natural movement should be explained. The long-term effects upon Gem beach and the barrier beach should be discussed in more detail. Beach nourishment practices that are planned for these areas should be described.

Sediment Quality

Section 2.39 in the EIS on sediment quality is based on a misquote from our July 27, 1977, letter. Furthermore, phosphorus was not the only parameter used by USEPA to determine the sediment's pollutional classification. The other parameters that exceeded our sediment guidelines were total volatile solids, COD, TKN and, in one instance each, lead and nickel.

Water and Sanitary Facilities

According to the EIS, shallow private wells are the principal source of drinking water on Catawba Island. From our conversations with the Ohio EPA, drinking water quality problems exist on Catawba Island because the wells and the septic tanks are in shallow and permeable glacial deposits and dolomitic bedrock. The EIS should discuss the extent of these problems and what measures the State and county health authorities are implementing to correct them.

The EIS indicates that plans are being made to extend Port Clinton's water supply distribution system to Catawba Island by 1979 or early 1980. The likelihood that these plans will be implemented and the source and status of funding should be discussed in the EIS. If Harbor Island decides not to connect or is unable to connect to the proposed distribution system, and the breakwater configuration adversely affects the quality or flow rate of Harbor Island's intake water, the EIS should explain what actions will be done to correct these problems and the party responsible for these corrections.

The EIS should explain whether old trailer and cottage developments are being required by health authorities to construct package plants to eliminate the problem of ground water contamination. It is our understanding that all new trailer and cottage developments require treatment by small package plants. The degree of treatment afforded by these plants and their general effect upon West Harbor waters and sediments should be described. Any problem of septic tank leachates and bacteriological or viral contaminants entering West Harbor that may be shown by existing water quality data within West Harbor and Lake Erie should be discussed.

Even though planning for adequate wastewater treatment facilities is in progress, and a 208 plan for the Toledo Metropolitan Area Council of Governments is being prepared, the increased use of West Harbor and related secondary private development could cause an increase in pollutants in the harbor. The area presently uses on-site treatment systems for waste disposal. Ottawa County has made application to USEPA for a Step 2 construction grant for design of a wastewater treatment system to serve Danbury Township, including East Harbor State Park. Additionally, Catawba Island is Number 212 on the Ohio Municipal Project List for a Step 1 construction grant and therefore should be funded within the next year. Regionalization of Catawba Island with the proposed Danbury Township facilities will probably be one of the alternatives considered in the preparation of a facilities plan for Catawba Island.

The description of marine sanitary facilities service and treatment in the area (on page 26) should be expanded and sufficient information should be included so the reader can determine whether increased use by recreational boaters will aggravate water pollution problems in the harbor.

Biota - Terrestrial Community

We note that the dredging of the recommended channel would remove 26,000 square feet of terrestrial habitat, including a small island. It should be indicated whether any bird rookeries or roosting areas exist on this island or other islands in the harbor.

New Development and Secondary Impacts

Section 4.33 indicates that most new development would be immediately along the shoreline in the form of additional docking facilities and marinas. The zoning map for Catawba Island Township (Figure 5) designates shoreline areas adjacent to West Harbor as recreational/commercial land use. The extent and timing of development of these areas with and without the project should be discussed. The potential water quality effects of further development in and around this harbor

have to be addressed in the EIS. It would seem appropriate to determine the extent of development and additional boat traffic that could occur in West Harbor and still maintain applicable water quality standards. The EIS should describe in general the various nonpoint and point discharges in West Harbor and Middle Harbor and their overall effect upon water quality and sediment quality. Ohio EPA should be contacted for assistance on determining the assimilative capacity of the harbor and the extent of boat traffic that the harbor will handle without degrading water quality.

Some commitment from local authorities to control development of the shoreline is necessary, particularly if such development would result in the degradation of water quality in West Harbor.

Dredge Disposal

Sections 4.35 and 5.01 of the EIS imply that the material from the interior of West Harbor "would be suitable for harbor disposal" without confinement. This implication is based on the July 27, 1977, letter from Mr. Timm of USEPA, that stated that the material does not need to be isolated from the aquatic environment and suggested that the construction of a disposal site within West Harbor itself would be both economical and environmentally least objectionable.

Since additional information on the project has been made available and the fact that upland disposal sites exist, we have determined that a water site may be neither economical nor environmentally least objectionable. In most cases, water sites are the most environmentally objectionable. The use of upland sites should be given the greatest priority. Before and during the November 4, 1977 meeting, Mr. Robert L. Kay indicated the possibility of using agricultural fields and other upland properties adjacent to Buck Road for dredged disposal. Wetlands creation would be generally acceptable in an area that was biologically sterile and did not have any natural potential to improve water quality and/or become biologically significant.

The statement in the letter that "...isolating the material from the aquatic environment is not required" was made because of the general absence of toxic substances and bioaccumulative materials in the harbor sediments. It does not mean that we would necessarily condone noncontainment, dumping, side casting, and marsh creation with the dredged sediments inside West Harbor, Middle Harbor or East Harbor, or in any open waters or wetlands other than Lake Erie. However, these sediments are of such a quality that they do not have to be completely and permanently isolated from the aquatic environment within impermeable dikes. The chemical constituents or materials from the dredged sediments could be allowed over time to enter the inner harbors in such quantities that they could be assimilated into the aquatic ecosystem.

Alternatives to the Proposed Action

The statement is made in section 6.08 of the EIS that the Gem Beach Channel Plan "...would result in the least change in the amounts of terrestrial and aquatic habitat in the area..." The EIS indicates that because a lesser amount of dredging and a smaller containment facility would be required, there "...would be essentially no impact on terrestrial fauna and flora and minor impact on aquatic biota."

Reasons for proposing an additional entrance in lieu of improving the existing entrance to handle boat traffic should be explained. The difference in dredging and disposal requirements should be discussed. It should be explained why two entrances are essential for boating safety and why one large entrance channel, using the existing boat channel, is not more favorable from an environmental and economic standpoint. The issues related to restricted sailboat use of the harbor and reduction in fish benefits should be related to the total costs of the project and the cost benefit ratio. The small amount of additional fishing and recreation benefits that are obtained for East Harbor State Park from the implementation of the preferred alternative should be compared to the environmental tradeoffs of additional dredging, disposal, significant adverse terrestrial and aquatic impacts. The Gem Beach Channel Plan does not appear to require such tradeoffs.

The EIS should provide a description of the different dredging and disposal alternatives and their respective water quality effects. For example, the use of a pipeline dredge with barges for hauling the dredged material to a disposal site could result in significant overflows from the barge in order to make an economic load. Much of the phosphorus that is associated with the fine clay particles in the dredged sediments could be resuspended and released to West Harbor and Lake Erie. In addition, pipeline dredging will result in considerable quantities of water that may have to be discharged back to the harbor. The retention time and the quality of the waters discharged from the disposal area are extremely important and should be taken into consideration in the design of the containment facility. Consideration should be given to the use of dredging equipment that has the design or operational capability to minimize turbidity during dredging operations. The possible use of a clamshell with an hydraulic closure attainment, the Mud Cat technology, silt curtains around the dredge operation (if currents do not prohibit), and other dredging methods should be considered.

Some of the unpolluted sand material from the harbor could be used in the construction of dikes and horizontal sand blanket drains for an upland containment area. Preparation of the disposal site with horizontal and vertical sand and gravel drains would not only accelerate the drainage of the containment area and the consolidation of the dredged spoil area, but would also provide a more stable base for dike construction. These drainage methods as well as other dewatering techniques could increase the storage capacity of the upland site and reduce the time period that the upland area would be put out of use.

With regard to the alternative disposal sites designated in the EIS to contain the sediment classified as polluted, upland Site 5 appears to be the most acceptable. If this site were unable to contain all the material, other upland sites should be considered, such as the agricultural fields. Consideration should also be given to drying the material in an upland site and then removing it, to increase the site's capacity.

We understand that the owner of Site 3 intends to develop the area into a trailer park. If the owner has a Corps permit and it is inevitable that the area will be filled, we believe consideration should be given to placing some of the dredged material at this site.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

C52/JLR

OCT 5 1977

TO: William Aron
Director
Office of Ecology and Environmental Conservation

FROM: *for* *Gordon Lill* *Allen F. Poindexter*
Deputy Director
National Ocean Survey

SUBJECT: DEIS #7709.12 - West Harbor, Ohio Recreational
Navigation Improvements

The subject statement has been reviewed within the areas of NOS responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

The following comment is offered for your consideration.

Geodetic control survey monuments may be located in the vicinity of the proposed disposal sites. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments.





**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES**

Great Lakes Environmental Research Laboratory
2300 Washtenaw Avenue
Ann Arbor, Michigan 48104

September 21, 1977

TO: Director
Office of Ecology and Environmental Conservation, EE
E.J. Aubert

FROM: Eugene J. Aubert
Director, GLERL, RF24

SUBJECT: DEIS 7709.12 - West Harbor, Ohio Recreation Navigation
Improvements

The subject DEIS, prepared by the Corps of Engineers, Detroit District, on navigation improvements at West Harbor, Lake Erie, has been reviewed and comments herewith submitted.

The proposed construction of West Harbor breakwaters and dredging of navigation channels will greatly improve the utility and safety of the harbor. Short-term reduction of water quality by construction activities should be acceptable.

The two steel pile breakwaters will intercept the littoral drift passing the harbor site in both directions. As a result, some sand accumulation can be expected at the breakwaters. Further away from breakwaters, erosion of shoreline will increase. Particularly exposed to erosion will be the shoreline some 2,000 - 3,000 feet east of the harbor. Disposal of clean sand should be used to protect the exposed shoreline.



Ohio Department of Natural Resources

Fountain Square • Columbus • Ohio 43224 • (614) 466-3770

October 26, 1977

COMMENTS ON DRAFT ENVIRONMENTAL STATEMENT West Harbor, Ohio, Recreational Navigation Improvements (U.S. Army Engineer District, Detroit, Michigan, August, 1977)

There is no question of the need for navigational improvements at West Harbor which has perhaps the largest concentration of recreational boating on Lake Erie. As lake levels continue to decline from the exceptionally high levels of recent years, the depth of West Harbor has decreased to approximately three to four feet. Increased recreational opportunities for boaters and a harbor of refuge for small craft would be provided with implementation of this project. Particularly notable is improved boater safety. The very rapid changes in weather conditions characteristic of Lake Erie often create hazardous conditions at West Harbor when many boaters seek refuge from severe weather conditions.

The Draft Environmental Impact Statement could have described the problems and dangers to recreational boating in the project area in greater detail, but the authorization of the proposed improvements speaks for the need for this project. This Department supports the recommended plan described in paragraph 1.05 of the environmental statement. It should result in the greatest and fairest public benefit.

GENERAL COMMENTS

Several important elements of the draft environmental statement require additional information so that the project's effects can be better evaluated. Additional data and analysis in the following areas will expedite the final design and implementation of the project and will also insure that unquantified environmental values are given appropriate consideration in decision making along with economic and technical considerations:

1. Identification of major long-term effects and irreversible commitments of resources;

2. Description of the project area environment;
3. Relationship to land use plans and other projects in the area, and to appropriate governmental policy; and
4. Current state-of-the-art technology in dredging and dredged material disposition.

Besides the provision of navigation improvements and future increased recreational opportunities, the proposed action involves another major commitment of resources: the disposition of approximately 562,600 cubic yards of dredged material high in organics and phosphorus.

Paragraph 2.39, page 22, makes reference to the U.S. EPA preliminary determination that the sediments are unsuitable for open lake disposal. The U.S. EPA in the July 27, 1977 letter listed in Appendix B indicated that sediment samples located in the main portion of West Harbor contained a high concentration of phosphorus, with "significant" phosphorus releases from samples in the elutriate test. The stated "basic strategy" of the U.S. EPA for the protection and improvement of Lake Erie is phosphorus removal: "The transfer of high concentrations of nutrients, particularly phosphorus, and high oxygen demanding material to Lake Erie is clearly undesirable." However, confirmation of the reported phosphorus values, a detailed enumeration of sediment background nutrient levels, and comparison to conditions in Western Lake Erie should provide relativity on the pollution potential of West Harbor sediments. Data may demonstrate, for instance, that the goal of protecting Lake Erie may be achieved by open lake disposal of West Harbor dredging.

In the ongoing Lake Erie Wastewater Management Study (LEWMS), the U.S. EPA used a computer-based mathematical model to determine the relationship between pollutant loads and in-lake water quality. It was found that regeneration of pollutants from lake bottom sediments is not a major source of pollution.

The Ohio Department of Natural Resources has specific recommendations for the method and location of open-lake disposal, which is in fact the first recommendation of this Department for disposal of sediments from within West Harbor. Open lake disposal should not be rejected as an alternative based simply on sediment analysis data. It is hoped that the U.S. Army Corps of Engineers will re-assess dredge spoil alternatives based on the following:

1. The most accurate prediction of phosphorus releases to lake waters from each of the alternative disposal methods based on current scientific knowledge. It is noted that the U.S. EPA

has already determined that because West Harbor sediments do not contain significant concentrations of toxic or bio-accumulative materials, that "isolating the material from the aquatic environment is not required."¹

2. To protect the aquatic resources of the project area environment the first choice for spoil deposition is an upland site. An open lake site is considered the next best alternative because it minimizes the loss and alteration of critical water habitat (an acceptable location for open lake deposition in the western basin should be determined from an investigation of current research data). Diked disposal sites are the least desirable alternative because of the loss of aquatic/wetland habitat, which is a critical resource in the project area.
3. Consideration of technically feasible mitigative measures for open lake disposal with state-of-the-art technology (i.e.: oxygenation of dredged material slurry during disposal to reduce immediate oxygen demand to a tolerable level during disposal; pump-down technique for discharging material almost directly on lake bottom; and selecting optimum site for deposition).
4. Most current data on the effects of open lake disposal and confined disposal based on the results of dredged materials research.

Again, as with the evaluation criteria developed for the EPA/COE on the discharge of dredged material into ocean waters, the evaluation of potential for environmental impact of dredged material disposal should emphasize biological effects, rather than simple chemical presence of contaminants.

Compliance with the Water Resources Development Act of 1976 (P.L. 94-587) cannot be achieved without reference to or use of research results from the Dredged Material Research Program (DMRP). The biological and water-sediment quality effects of open-water disposal of dredged material are being evaluated under the Environmental Impacts and Criteria Development Project by the DMRP in Task 1A: Aquatic Disposal Field Investigations. Results from the Ashtabula, Ohio Field Study (Work Unit 1A08) are applicable to this project. Current research under the DMRP's Task 6B: Treatment of Contaminated Dredge Material, may also be helpful in determining the feasibility of alternative actions and mitigative measures for dredge disposal. Recent findings from the Buffalo District's Lake Erie Wastewater Management Study (LEWMS) should also be considered.

¹ U.S. EPA Region V letter, July 27, 1977, DEIS, p. B-22.

It is noted that the consideration of alternatives for dredge disposal requires that each site be evaluated on its own particular characteristics. The Corps of Engineers should supply additional information critical to the EPA's opposition or support of the alternative disposal plans:

1. Existing and potential quality and use of the water in the disposal areas;
2. Other factors, such as depth and current at the disposal sites;
3. Time of year of disposal;
4. Likely recurrence of disposal in the receiving area;
5. Disposal methods alternatives; and
6. Predicted long and short term effects on receiving water quality.

It is suspected that when considering the total ecological impact of each of the alternatives including no action, open lake disposal of the inner West Harbor sediments performed with appropriate mitigative measures may be the most suitable disposal alternative.

The description of the project area environment should be expanded in the final environmental statement. Some clarification is necessary also. A reassessment of the use patterns at East Harbor State Park and future plans for recreational development of the park by this Department has determined that additional land base at site 1 is not needed or desirable.

Middle Harbor is described as being located adjacent to East Harbor State Park in paragraphs 2.07 and 4.35. The description of East Harbor State Park should be revised to include the entire Middle Harbor and the state-owned lands on Harbor Island and submerged lands in West Harbor.

Other federal projects in the area, paragraph 3.07, should include the proposed marina improvements at East Harbor State Park. The Ohio Department of Natural Resources is awaiting final approval of a Land and Water Conservation Fund application to improve docks at this facility. The state-owned lands described in the previous paragraph were acquired with federal assistance through the Land and Water Conservation Fund Act Program.

The project area environment is a critical resource area. Ohio DNR critical resource areas policies should provide some general guidance for selection of the final project plan. "It is the policy of the Department to preserve, protect and where desirable, to restore the resources of the

Lake Erie Coastal Zone for the enjoyment of the current and succeeding generations."² The proposed channel improvements, breakwater construction at the harbor entrance, and maintenance dredging are in conformance with the ODNR policy. Plans to provide a walkway and handrail for sport fishing on the south breakwater is a particularly notable attempt to utilize the lake resource for the enjoyment of current and future generations.

The use of the approximately 127,900 cubic yards of dredged material composed of clean sands for beach nourishment along the barrier beach facing Lake Erie is in conformance with Department policy which strenuously opposes the removal of sediments from the littoral system. However, plans should be developed and the EIS should state specifically, that this material will be used for beach nourishment at the East Harbor beach.

The Ohio DNR considers this project to have the highest priority in the area for recreational boating. The Department is committed to assist in the non-federal assurances for the project and will cooperate in every way possible to ensure its completion at the earliest possible date.

SPECIFIC COMMENTS

1. Reference should be made in the Draft EIS to appropriate data from the Dredged Material Research Program so that state-of-the-art technology and current knowledge on effects of dredge disposal may be used in comparing possible alternatives for disposal. The following report, prepared for the Division of Wildlife, should also be investigated and referenced: The Fishing Potential, Special Management Areas, and Their Interaction with Dredge Spoil Sites in Lake Erie, by Suzanne M. Hartley and Allen R. Van Vooren.
2. Data on the flora of the project area could be expanded. The Ohio Biological Survey and the Ohio Natural Heritage Program inventory may be useful sources of information, especially in regard to the existence of rare or threatened species. The following publication should be investigated and referenced:

Changes in the Marsh and Aquatic Vascular Flora of East Harbor State Park, Ottawa County, Ohio, Since 1895, David L. Moore, Ohio Journal of Science 76 (2): 78, 1976.

² Critical Resource Areas ODNR Policy, 1977.

3. Was the elutriate test on West Harbor sediment samples conducted at a specific dissolved oxygen level? Might test results differ from expected releases of phosphorous resulting from open lake disposal?
4. Because West Harbor sediments do not contain significant concentrations of toxic or bioaccumulative materials, the U.S. EPA has determined that "isolating the material from the aquatic environment is not required." Will there be runoff from a confined disposal site? Based on current knowledge from dredged material research, what is the likelihood of phosphates being released to lake waters from a confined disposal site?

Lake Erie Advisory Committee



DEDICATED TO THE PRESERVATION OF
LAKE ERIE, ITS WATERS, FISH AND WILDLIFE



Monroe, Michigan 48161

September 13, 1977

Subject: Draft Environmental Statement, West Harbor, Ohio (Recreational Navigation Improvements) August 1977

To: U.S. Army Corps of Engineers, Detroit District
P.O. Box 1027
Detroit, Michigan 48231
Attn: Environmental Resources Branch, Engineering Division

Dear Sir:

The Lake Erie Advisory Committee appreciates the opportunity to provide comments on the Draft Environmental Statement (DES) for recreational navigation improvements at West Harbor, Ohio. We concur in the need for these improvements and specifically endorse Site 1 for disposal of dredged materials.

The concept of creating backbarrier marshes by restoring eroded or diminished barrier beaches is consistent with our belief that the negative impact on Lake Erie marshes by high water and fills can be reversed. Site 1 as detailed in Section 5 of the DES conforms to our philosophy of backbarrier marsh restoration. Backbarrier marshes are a natural phenomenon along the west and south shores of Lake Erie. It matters little who or what provides the barrier, nature or man. The wetlands behind such barriers thrive and are tremendously productive. Their development should be encouraged wherever possible to help increase the overall inventory of marshes along our coastline. We will never have more marshes landward of the high water mark because of roads, bulkheads, agricultural pursuits, and in general all manner of development. Therefore, if we are to increase the inventory of viable wetlands, they must be carved out of the extensive shoalwaters of Lake Erie. In this way we can learn to use the unique "seiche" feature of Lake Erie to enhance biological productivity to counter the trends of urban monoculture. There are many places along the shoreline where viable marsh communities can be created or restored in this fashion with the use of dredge materials in a suitable container. Clean organic materials dredged from navigation channels can be used to enrich marsh areas as well. A careful study of the existing disposal sites acting as barriers should be conducted to see if marshes do restore themselves and a total program for marsh regeneration should be conceived for the entire western basin of Lake Erie.

cc U.S. Fish and Wildlife Service
ODNR
OEPA
M.S. Waterbury

Sincerely,
Richard G. Micka
Richard G. Micka
1216 Riverview
Monroe, Michigan 48161

APPENDIX B
Letters of Coordination

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

311 Old Federal Building, Columbus, Ohio 43215

November 22, 1976

Mr. P. McCallister, Chief
ATTENTION: NCEEED-PB
Engineering Division
Department of the Army
Corps of Engineers
Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

This is in response to your letter of November 5, 1976, concerning your Phase I General Design Memorandum investigations for West Harbor, Ohio.

We do not know where our expertise will fit into your study. If you feel we can assist you, please contact our District Conservationist, Mr. Robert Ball, in our Field Office at 149 Church Street, Oak Harbor, Ohio 43449. His telephone number is 419-898-6431.

Sincerely,

Robert E. Quilliam

Robert E. Quilliam
State Conservationist





United States Department of the Interior

FISH AND WILDLIFE SERVICE
GREAT LAKES AREA OFFICE
Room 301, Manly Miles Building
1405 S. Harrison Road
East Lansing, Michigan 48823

IN REPLY REFER TO:

December 2, 1976

Colonel Melvyn D. Remus
U.S. Army Engineer District,
Detroit
P.O. Box 1027
Detroit, Michigan 48231

Dear Colonel Remus:

This letter is in response to the November 5, 1976 letter from P. McCallister requesting our comments on the November 1976 Draft Plan of Study on the Recreational Navigation Project, West Harbor, Ohio. Our comments are submitted in accordance with the Fish & Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The November 5, 1976 letter also requested that we indicate the level of our participation that we are willing to provide to assist you in your study. Our comments are as follows:

Our participation will comply with both the spirit and intent of the Fish & Wildlife Coordination Act. We will continue our participation throughout the study of this project to the extent that funding and manpower allow. We are, as in the past, always available to guide your efforts with regard to the area of our particular expertise in the study phases and in the development of good solutions for the project area.

Page 4 Current Needs and Development Objectives

It appears that there will be a large quantity of dredge materials resulting from the project as planned, depending on which route or alternative is used. It is our belief that dredge materials should be used as a beneficial resource and not discarded as a waste product from federal navigation projects.

Therefore, the POS should contain provisions to identify useful purposes for the initial and subsequent maintenance dredge materials as an integral part of the project.



Page 10 Plan Formulation

The presentation of the basic objectives for the plan formulation should include an equal consideration of the environmental factors as well as economic factors. It is stated that the plan should maintain or improve the natural environment, but it does not state that these environmental factors will be valued equally with the economic considerations of the project.

Among the criteria that are to be used in formulating a plan, we suggest adopting the following to give equal consideration to fish and wildlife resources and, therefore, be consistent with the provisions of the Fish and Wildlife Coordination Act.

Fish and wildlife resources should be given equal consideration with other project purposes or benefits.

Page 15 Economic Studies

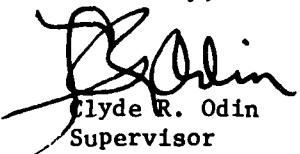
We recommend that the POS contain provisions to include public access for shore and breakwater fishing as part of the feasibility study.

Page 15 Work Schedule

We hope that the ambitious study schedule allows ample time for an adequate evaluation of alternatives which might arise as a result of public meetings.

We appreciate the opportunity to provide our comments to you with regards to this project.

Sincerely,



Clyde R. Odin
Supervisor

cc: RO, Twin Cities, MN (ES)

JAMES A. RODGERS
Secretary

FRED E. MORR
Director



STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OHIO DEPARTMENT'S BUILDING
COLUMBUS 43215

December 2, 1959

Colonel James T. White, Jr.
District Engineer
U. S. Army Engineer District, Detroit
Post Office Box 1027
Detroit, Michigan 48231

West Harbor - Improvements
for Recreational Navigation

Dear Colonel White:

This will certify assurance of the capability and willingness of the Ohio Department of Natural Resources to provide the requirements of local cooperation or reimbursement outlined in your letter of inquiry regarding the West Harbor project. These requirements will be provided at the time requested by the District Engineer, U. S. Army Corps of Engineers, in accordance with applicable legislative authority governing the project.

Sincerely,

FRED E. MORR
Director

FEM:bg /CTF

3 Ginger Hill Lane
Toledo Ohio 43623
December 3, 1976

Engineering Division
Comments on "West" Harbor
Corps of Engineers
Detroit District
Michigan 48231

Please pardon the form of address. I have been away and since coming home have lost the cover address or letter for comments on the Plan of Study on Recreational Navigation for "West Harbor Ohio.

I presented this study to the Board of the Toledo Naturalist Ass'n since they sponsor a monthly bird count on the Catawba Peninsula and are concerned about natural areas. The consensus of their opinions on the project were: The whole area was oncea wetland and human occupation has changed the area drastically. The making of a State Park at West Harbor would destroy valuable fishing grounds. They do agree that high water has done a great deal of damage in the area and that dredging of West Harbor is essential.

In the process, they agree that Middle Harbor must be protected as this is the only section remaining a little wild. I visited this area last spring when it was inaccessible. There would be no reason for it to become accessable.

The big problem will be the disposal of the dredging spoils. TNA has no position or expertise in this field, except to comment that islands do provide nesting sites. However, the Lake Erie basin Committee of the League of Women Voters does have a position on this subject. I cannot speak for them officially, since I am only an advisor at this time, except for the Citizens Advisory Committee of the Maumee Level B.

Everywhere, the struggle to maintain or restore water quality of Lake Erie is an on going concern.. I personally do not know about the water quality of this area or about soil pollution from human activity here. I should think there would be no industrial pollution. The maintenance of water quality should be a major guideline in establishing West Harbor as a boat channel. I am sure that if you follow your own rules and the dictates of 92-500 the spoil will be properly taken care of.

We would like to reemphsize, the need for proper sanitary disposal facilities for the craft using the Harbor now and in the future.

"respectfully submitted,

Priscilla Waterbury
Mrs. Neil Waterbury
Chr. Conservation Committee TNA
Advisor, Lake Erie Basin Committee
League of Women Voters of the U.S.



Ohio Department of Natural Resources

Fountain Square • Columbus, Ohio 43224 • (614) 466-3770

December 6, 1976

Colonel Melvyn D. Remus, District Engineer
U. S. Army Engineer District, Detroit
150 Michigan Avenue, PO Box 1027
Detroit, Michigan 48231

Dear Colonel Remus:

This will acknowledge receipt of your plan of study for the authorized navigation improvements for West Harbor which was transmitted with your letter of 12 November 1976.

While we basically concur with the proposed plan of study, there are at least two items presented which have raised some concern. The first item is in regard to the proposed time table for initiating construction of the proposed project. Page 16 of the plan of study indicates that North Central Division approval of the Phase I G.D.M. is not scheduled until January 1978. This would mean that the Phase II G.D.M. would not be initiated until Winter or Spring 1978. Given a six to seven months time period for preparation and approval of the Phase II G.D.M., plans and specifications for the proposed project would not be initiated until Fall 1978. Provided funding is made available in the Fiscal Year '79 budget, a construction start could not be anticipated until Spring 1979. Once again, I would like to reiterate our strong support in the proposed project for West Harbor and of the urgent need to initiate construction by at least Spring 1978.

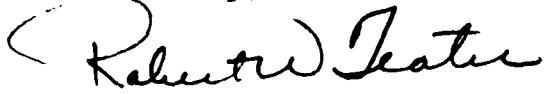
The other item of concern deals with the proposed interest rate that will be used by the Detroit District in the updated economic analysis for the West Harbor project. It is indicated on pages 14 and 15 of the plan of study that the current interest rate in formulating water resources development projects will be used. It is our understanding that the current interest rate being used is 6 3/8%. It should be noted, however, that in our judgment and in accordance with the provisions of Section 80 (b) of the 1974 Water Resources Development Act, the prevailing interest rate immediately prior to 24 December 1968 would be applicable to the West Harbor project. As you may be aware, this rate was set at 3 1/4%, provided the non-federal sponsor certified its

Colonel Melvyn D. Remus, District Engineer
U. S. Army Engineer District, Detroit
December 6, 1976
Page -2-

willingness to assure the requirements of local cooperation. For your information and use, I have enclosed a copy of the 2 December 1969, letter from a former Director of the Ohio Department of Natural Resources that provided this necessary certification.

We appreciate your interest in the proposed West Harbor project and would like to discuss these items of concern with you upon your visit to Columbus on 10 December.

Sincerely,


ROBERT W. TEATER
Director

RWT/slt
Enclosure



Ohio Department of Transportation

25 South Front Street
James A. Rhodes, Governor

Columbus, Ohio 43215
Richard D. Jackson, Director

December 6, 1976

Mr. P. McCallister
Chief, Engineering Division
Detroit District
Corps of Engineers
Box 1027
Detroit, Michigan 48231

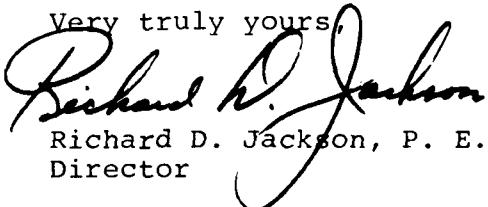
Re: West Harbor, Ohio
NCEED-PB

Dear Mr. McCallister:

We have reviewed the Plan of Study on Recreational Navigation at West Harbor, Ohio and, while this department is not directly involved in the study or the work that might result therefrom, we are very much interested in improving recreational facilities throughout Ohio and especially along the shores of Lake Erie.

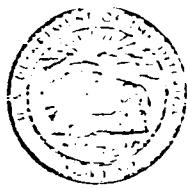
Even though the Ohio Department of Transportation is unable to participate in the study, other than possibly supplying information from our files with respect to land transportation in the area, we do support the position of the Ohio Department of Natural Resources and urge that the study be progressed as rapidly as possible.

Very truly yours,



Richard D. Jackson, P. E.
Director

RDJ:sjc



United States Department of the Interior

BUREAU OF OUTDOOR RECREATION

LAKE CENTRAL REGION
3853 RESEARCH PARK DRIVE
ANN ARBOR, MICHIGAN 48104

IN REPLY REFER TO:

D6427GL
Lake Erie
XC26

December 10, 1976

Mr. P. McCallister
U.S. Army Corps of Engineers,
Detroit District
Attn: NCEED-PB
Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

This is in response to your request for early coordination regarding the Phase I General Design Memorandum investigations for West Harbor, Ohio.

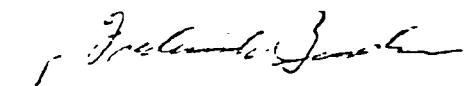
Several acquisition and development projects have been funded through the Land and Water Conservation Fund, administered by this Bureau, within the East Harbor State Park and the Middle Harbor area. They include the following projects:

- 39 - 00007 East Harbor State Park, acquisition of 359 acres
- 39 - 00003 East Harbor State Park, development of 16 acres
- 39 - 00282 East Harbor Marina, facilities development
- 39 - 00295 East Harbor Wall Protection, repair lake wall and
 other facilities
- 39 - 00300 Middle Harbor, acquisition of 213 acres

Planning and coordination should be undertaken with Robert W. Teater, Director, Ohio Department of Natural Resources, to assure compliance with Section 6(f) of the Land and Water Conservation Fund Act of 1965, as amended. Location of dredge disposal sites and construction activities should not result in a loss of recreation opportunities within East Harbor State Park.

We hope these comments will be of help to you. We will not be able to actively participate in the study at this time; however, we will continue to provide review comments as more specific details become available.

Sincerely yours,


John D. Cherry
Regional Director



UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

149 Church Street, Oak Harbor, Ohio 43449

December 13, 1976

Mr. Dale Monteith
Planning Branch
Detroit District, Corps of Engineers
Box 1027
Detroit, Michigan 48231

Dear Mr. Monteith

I have carefully reviewed the Draft Plan of Study on Recreational Navigation for West Harbor, Ohio. The Draft is complete and it appears to assess the situation well.

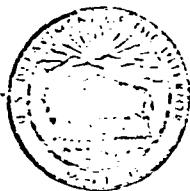
At this time I have no specific comments on the proposed project. Our office is quite willing to participate in your planning process on any matters where our expertise may be needed. The only resource information I am aware of which might interest you would be a soils map of the West Harbor area. Ottawa County does not have a comprehensive soil survey yet, but we can utilize existing local mapping or even call on our Soil Scientists to map specific areas where needed.

Please feel free to contact our office again if you believe we can be of assistance.

Incredibly

John H. Miller, District Conservationist
SOIL CONSERVATION SERVICE
Box 1027, Detroit, Michigan 48231





United States Department of the Interior

NATIONAL PARK SERVICE

MIDWEST REGION
1709 JACKSON STREET
OMAHA, NEBRASKA 68102

IN REPLY REFER TO:
L7423 MNR DCL

DEC 17 1976

Chief, Engineering Division
Detroit District, Corps of Engineers
Box 1027
Detroit, Michigan 48231

Dear Sir:

Reference your letter of November 5, 1976, pertaining to your Phase I General Design Memorandum investigations for West Harbor, Ohio.

No established or studied units of the National Park Service or sites registered or eligible for registration as National, Natural or Environmental Educational Landmarks appear to be adversely affected by this proposal. Accordingly, we have no objections to the performance of this work as related to this area.

We note that coordination is planned with the State Historic Preservation Officer concerning this project. We suggest that all recommendations made by the State Historic Preservation Officer be followed including consultation with the National Register of Historic Places. Also, we recommend that the State Archeologist, Mr. Thomas H. Smith, Ohio Historical Society, Division of Archaeology, Columbus, Ohio 43210, be consulted concerning this project. Copies of all correspondence should be included within the impact statement.

Sincerely yours,

Randall R. Pope
Acting Regional Director



AMERICAN REVOLUTION BICENTENNIAL
1776-1976

ODNR

Ohio Department of Natural Resources

Fountain Square • Columbus, Ohio 43224 • (614) 466 3770

February 17, 1977

Colonel Melvyn D. Remus, District Engineer
U.S. Army Engineer District, Detroit
150 Michigan Avenue
P.O. Box 1027
Detroit, MI 48231

Dear Colonel Remus:

On behalf of Governor James A. Rhodes, I am pleased to present the State of Ohio's position on this important project.

West Harbor represents one of the state's finest boating resources, which is attested to by the 3,000 boats which are permanently docked there even now without adequate egress and ingress to the lake. Additionally, hundreds of other boats are trailered into the harbor area each week. We have, for some time, been concerned with the inadequate access to Lake Erie for the many boaters docking and using West Harbor, and are further concerned with continued boating accidents threatening lives and costing thousands of dollars in property damage. It is fortunate that no lives have been lost to date, despite numerous serious accidents.

It is readily apparent that the most feasible permanent solution to this access problem is to construct another channel, in addition to that afforded by Gem Beach, to meet the demand for passage to and from the lake, particularly in times of storm.

We, in the Department of Natural Resources, consider this project to have the highest priority in the state for recreational boating and urge the Corps of Engineers to expedite the preparation of plans and proceed with the construction of the project at the earliest possible date. I would also reiterate the State of Ohio's intent, first made in 1969, to assist in the non-federal assurances for the project in order to facilitate its completion.

While swift action on advanced planning and construction on this project is essential, there will be a period during which boaters will be denied adequate access to the lake. This situation will be compounded by the predicted lower water levels of the lake during the coming season. Under these circumstances, all but the smallest boats would be denied passage through the natural channel due to shoaling conditions at the mouth

JAMES A. RHODES, Governor • ROBERT W. TEATER, Director

Colonel Melvyn D. Remus
February 17, 1977
Page 2

of the channel. In view of the imminent danger to life and property posed by overuse of the Gem Beach channel, especially under storm conditions, it is our strong recommendation that the Corps of Engineers undertake an interim dredging program to maintain the natural channel in useable condition for all boats until the permanent project is completed. This action is essential if the recreational potential of West Harbor is to be realized and the harbor area available to boaters as a refuge when impending storms force them from the lake.

We stand ready to assist the Corps in any way possible to expedite completion of this project.

Sincerely,



ROBERT W. TEATER

Director

RWT/csb

MCLEOD-PB

04 MAR 1977

Dr. Robert W. Teater, Director
Ohio Department of Natural Resources
Fountain Square
Columbus, OH 43224

Dear Dr. Teater:

This is in response to your 17 February 1977 letter presenting the State of Ohio's position on the West Harbor, Ohio, navigation project.

I wish to assure you that every effort is being made to insure that a permanent project in the interest of shallow-draft navigation at West Harbor becomes a reality in the most expeditious time. With respect to your request that an interim dredging program be instituted to provide a usable channel until a permanent project is completed, I am pleased to inform you that I have initiated a study under the authority contained in Section 3 of the 1945 River and Harbor Act. Among other things, Section 3 provides for the clearing and snagging of channels of an authorized project in order to restore the channel conditions to those which existed at the time of project authorization. Weather permitting, it is anticipated that the extent of remedial dredging will be known and the Section 3 study completed in two months.

Prior to initiation of emergency dredging work under the Section 3 authority, certain items of local cooperation are required by a legal entity and would correspond to those normally recommended for similar navigation work authorized by Congress. I will, therefore, be contacting your office to inform you of our report findings and request your interest in cooperating in this remedial work. For your information, the local assurances that could subsequently be required for the emergency work are as follows:

(1) Contribute in cash the local share of project construction cost, determined in accordance with existing policies for regularly authorized projects, in view of recreational benefits, land enhancement benefits or other special or local benefits expected to accrue.

8-14

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FROM 04/01/2010 TO 05/01/2010

NOEMD-PB

Dr. Robert W. Teater, Director

8:44 AM

(2) Provide without cost to the United States all necessary lands, easements, and rights-of-way required for construction and subsequent maintenance of the project including suitable spoil disposal areas with any necessary retaining dikes, bulkheads, and embankments therefor.

(3) Hold and save the United States free from damages that may result from construction of the project.

(4) Accomplish without cost to the United States alterations and relocations as required in sewer, water supply, drainage, and other utility facilities.

(5) Bear the costs of maintenance of the project until the time that the authorized project is constructed.

I appreciate your interest in this matter. If I can be of further assistance, please contact me.

Sincerely yours,



MELVYN D. KERAS
Colonel, Corps of Engineers
District Engineer

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FOR REPRODUCTION

ODNR

Ohio Department of Natural Resources

Fountain Square • Columbus, Ohio 43224 • (614) 466-3770

March 1, 1977

Colonel Melvyn D. Remus
District Engineer
U.S. Army Corps of Engineers
150 Michigan Avenue
Detroit, Michigan 48231

Dear Colonel Remus:

Enclosed, to further aid your planning personnel in developing the West Harbor Small Boat Harbor Project, are copies of the easements for the internal channels in West Harbor. Some question was raised at the recent workshop relative to the location of these channels and these easements are being furnished to help clarify any problems with the locations.

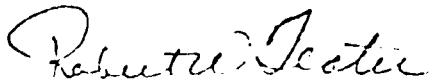
At this same workshop, held on February 13th, it was noted that \$180,000 was included in the non-federal estimated cost for this project for dredging channels to private boat docks. To our knowledge this is the first instance where this cost has been included in developing the initial project. This cost was not shown for the recently completed Ottawa River Small Boat Harbor Project Report.

We are cognizant of the requirement for local interests to provide service channels to principle docks and in berthing areas as set forth in the authorizing report and request a clarification on exactly what is considered to be principle docks and berthing areas in the West Harbor area. The access channel from the public boat launching ramp and to an available private service dock should and would be provided. Any channels in addition to these are normally provided by individual marina operators at their expense and are not included in any federal project cost for initial development.

Is the non-federal assurance for these channels a requirement that they be provided at the time of the federal project by the cooperating local agent, or is the intent to clarify that these channels are and will always remain a non-federal responsibility?

We would appreciate an early clarification of these channels and the respective costs associated with them.

Sincerely,



ROBERT W. TEATER

B-16 Director

NOSED-PC

Dr. Robert W. Teater, Director
Ohio Department of Natural Resources
Fountain Square
Columbus, OH 43224

15 MAR 1977

Dear Dr. Teater:

Thank you for your 1 March 1977 letter inclosing copies of easements obtained relative to the location of internal channels for the West Harbor, Ohio, shallow-draft navigation project.

With respect to costs associated with development of the initial project, the Interim Report prepared in 1962 showed a non-Federal cost of \$60,000 for dredging of channels in berthing areas. Price levels for October 1977 have increased this item to the \$120,000 discussed at the 17 February 1977 public meeting. This cost item is shown to recognize the fact that some access channel work will be needed. It is not, however, intended to infer that a cash contribution would be required at the time of Federal project construction. The intent of the cost listing is to clarify that these channels are and will remain a non-Federal responsibility.

Assurances for the West Harbor navigation project, as noted in House Document 88-245, are required to be provided by the State of Ohio. However, it is expected that the marina operators at West Harbor will assume the cost of providing the necessary access channel and berthing area dredging. Your office may seek to obtain this assurance from a local group, such as the West Harbor Association.

As stated above, the cost for local dredging activity to insure that project benefits are realized is an estimate of potential dredging required to provide boating access to the Federal channel. During our Phase I General Design Memorandum studies, we will be working with the West Harbor Association to determine where channels may be required, in order to update this local cost and corresponding benefits.

THIS PAGE IS UNCLASSIFIED
DATE 10/17/2014 BY SP-3

NOV 12 1977
Dr. Robert W. Teater

15 MAR 1977

I trust the above information is helpful. If I can be of further assistance, please do not hesitate to contact me.

Sincerely yours,

K

MELVYN D. REMUS
Colonel, Corps of Engineers
District Engineer

2

THIS IS A COPY OF A COPY
FOR YOUR INFORMATION ONLY

8-18

Enc1s.

JAMES A. RHODES, Governor • ROBERT W. TEATER, Director



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
COMMANDER (oan)
Ninth Coast Guard District
1240 East 9th St.
Cleveland, Ohio 44199
Phone: 522-3992

16500
Ser 250
28 June 1977

Mr. Howard R. Hoehn
Howard, Needles, Tammen & Bergendoff
One Erieview Plaza
Cleveland, Ohio 44114

Dear Mr. Hoehn:

This responds to your 12 May 1977 letter regarding proposed navigation improvements in West Harbor, Ohio.

Our revised plan for aids to navigation at West Harbor, Ohio called for one battery operated minor light at the outer end of each breakwater, one battery operated light on a pole at the junction inside the harbor and 16 single pile daybeacons. Estimated costs are as follows:

2 breakwater lights at \$12,500.00 each	\$25,000.00
1 light on pile	7,500.00
16 daybeacons at \$3,000.00 each	<u>48,000.00</u>
 Total	 \$80,500.00

Annual maintenance cost for each of the 3 lights is \$500.00 and \$100.00 for each daybeacon. Total amount of annual cost is \$3,100.00.

Sincerely,

H. H. Kotie for
H. H. KOTIE
Captain, U. S. Coast Guard
Chief, Aids to Navigation Branch
By direction of Commander,
Ninth Coast Guard District



Ohio Department of Natural Resources

OFFICE OF CHIEF ENGINEER
Fountain Square • Columbus, Ohio 43224 • (614) 466-4633

July 7, 1977

Howard Needles Tammen & Bergendoff
One Erieview Plaza
Cleveland, Ohio 44114

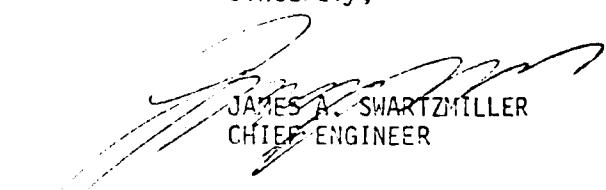
Attention: Howard R. Hoehn

Dear Sir:

With reference to our meeting on Tuesday, July 5th, attached is a quadrangle sheet indicating suggested waste disposal sites for material to be removed from channels for the West Harbor Boating project. Some of these sites are located on private property and agreements or easements will have to be finalized if they are ultimately selected as the disposal sites.

If the final report indicates that the inner harbor material is indeed polluted and must be confined, the sites shown should be considered for such confinement along with other solutions as we discussed. One possibility might be open lake dumping with clean material being placed on top and the possibility of confinement in some designated area already existing such as Huron Harbor should be considered.

Sincerely,



JAMES A. SWARTZMILLER
CHIEF ENGINEER

JAS:bm
Encls.

cc: Ralph Vanzant
Don Olson
R.L. Lucas
Norv Hall
Dale Haney
Fred Ball



Ohio Department of Natural Resources
DIVISION OF WILDLIFE

July 13, 1977

Mr. Carl Bruns
Howard, Needles, Tammen & Bergendoff
One Erieview Plaza
Cleveland, OH 44114

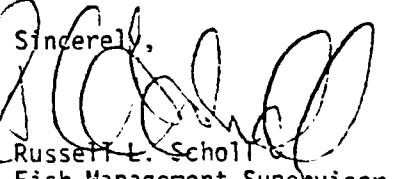
Dear Mr. Bruns:

In regards to our telephone conversation of July 6th, Gem Beach, the only existing West Harbor entrance, is the most highly utilized boating channel in the Ohio waters of Lake Erie. Dredging the natural opening and building two breakwalls to protect it would certainly reduce boating congestion of the area.

The potential number of fishing days at the proposed breakwall site would be approximately 250 days a year, if ice fishing accessibility is realized. Of course, storms and northeast winds will cut into that figure considerably.

The number of fishermen per day would vary from 1 to 200. During good fishing periods, on week days up to 100 fishermen may be utilizing the pier. Up to 200 fishermen may utilize the breakwall on good week-end days. If the area is easily accessible and properly maintained these figures should be attained.

If this office can be of further help please contact us again.

Sincerely,

Russell L. Scholtz
Fish Management Supervisor
Lake Erie Research Unit
P. O. Box 650
Sandusky, OH 44870

RLS/mot



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

JUL 27 1977

Mr. Philip McCallister
Chief, Engineering Division
U. S. Army Engineer
District, Detroit
P. O. Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

We have carefully reviewed the results of the analyses you submitted on seven sediment samples from West Harbor, Ohio.

The data indicate that the sediments from the area represented by stations 4, 6, and 7 are primarily littoral drift sand from Lake Erie. These three stations have very low concentrations of all parameters measured with the exception of phosphorus which is unusually high in all of the samples. Sediments lakeward of the point marked A on the attached map are suitable for unrestricted disposal.

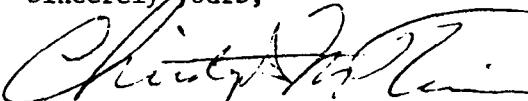
Stations 1, 2, 3, and 5 are located within the main portion of West Harbor and are primarily silt or finer materials. Sediments from all of these stations are highly organic with high volatile solids and moderate to high concentrations of COD and TKN. Their color is black or dark grey which also indicates the presence of organic material. There is an unusually high concentration of phosphorus in these samples. The elutriate test shows significant phosphorus releases from samples 2 and 4. The concentrations of metals, toxic materials, and hexane solubles (oil and grease) are low in all samples.

The results are consistent with a shallow, eutrophic body of water which has not been affected by wastes from heavy industry. It may have been affected by drainage from surrounding marshy areas and possibly by septic tank discharges in the vicinity.

Transfer of this material to Lake Erie is clearly undesirable. It is doubtful whether a similar type of sediment could be found in the open lake so that placing it on a similar substrate is improbable. The transfer of high concentrations of nutrients, particularly phosphorus, and high oxygen demanding material to Lake Erie is clearly undesirable. The basic strategy for the protection and improvement of Lake Erie is phosphorus removal. Therefore we oppose the disposal of this material in Lake Erie.

The sediments in West Harbor do not contain significant concentrations of toxic or bioaccumulative materials. Therefore isolating the material from the aquatic environment is not required. We suggest that a disposal site within West Harbor itself would be both economical and environmentally least objectionable. Such a site would have to meet the guidelines concerning wetlands. The possibility of using this material to create additional wetlands should be seriously considered.

Sincerely yours,



Christopher M. Timm
Director, Surveillance and Analysis Division

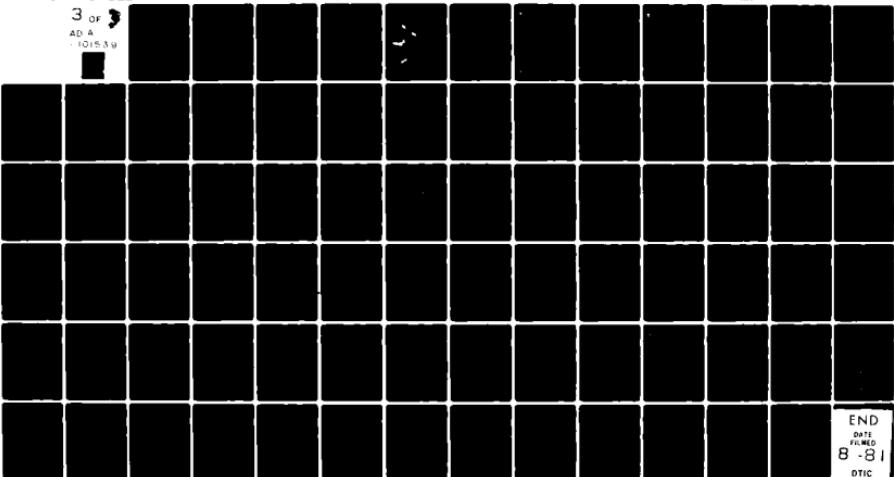
Enclosure

AD-A101 539 CORPS OF ENGINEERS BUFFALO N Y BUFFALO DISTRICT F/6 13/2
WEST HARBOR, OHIO RECREATIONAL NAVIGATION IMPROVEMENT. REVISION--ETC(U)
MAR 79

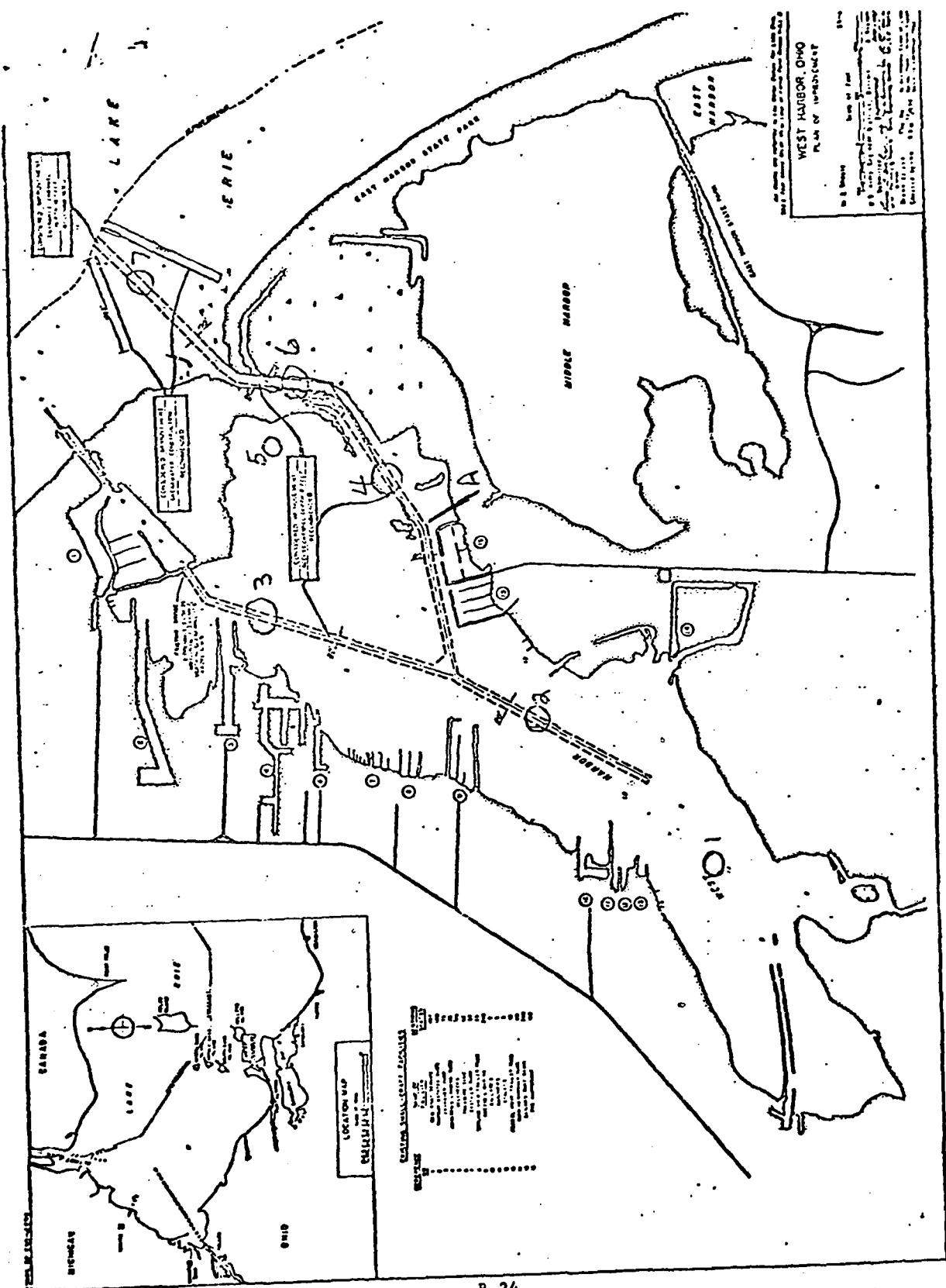
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DATE
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DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
COMMANDER (mep)
Ninth Coast Guard District
1240 East 9th St.
Cleveland, Ohio 44199
Phone FTS 293-3919

16475
5 October 1977

*Department of the Army
Detroit District, Corps of Engineers
Attn: Mr. F. McCallister
P.O. Box 1027
Detroit, MI 48231

Re: Draft Environmental Statement
West Harbor, Ohio Recreational
Navigation Improvements

Dear Mr. McCallister:

This office has reviewed the referenced statement and we encourage dredging of the natural channel entrance to provide improved access to West Harbor. High boating density in the entrance to the Gem Beach Channel has contributed significantly to the incidence of severe collision accidents. Moreover, underwater obstructions, made more hazardous by decreasing lake levels, have been the cause for vessel damage in the Gem Beach Channel, the only entrance to West Harbor.

J. A. WILSON
Captain, U. S. Coast Guard
Chief, Marine Safety Division
By direction of the Commander,
Ninth Coast Guard District

CEDAR POINT

November 8, 1977

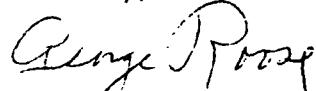
Mr. Dale Moteith
Corps of Engineers
Detroit District
P.O. Box 1027
Detroit, MI 48231

Dear Mr. Moteith:

This will confirm our telephone conversation of this day agreeing to disposal of dredged material on the property owned by Cedar Point, Inc. and GAR Realty Company. The road to Harbor Acres is the dividing line between the two properties with Cedar Point owning the north side to the water and GAR Realty Company owning the south side to the McCullough property.

I hope to be at the Catawba Township Hall on November 21 at 7:30 P.M.

Sincerely,



George A. Roose

GAR/dh



B-26

CEDAR POINT INC. SANDUSKY OHIO 44870 419/628-0830

November 29, 1977

Mr. Howard R. Hoehn
Howard Needles Tammen & Bergendoff
One Erieview Plaza
Cleveland, Ohio 44114

Re: West Harbor Recreational Navigation Improvements
Draft Environmental Impact Statement

Dear Mr. Hoehn:

This is in reply to your letter of November 22, 1977, and your conversation of the same date with Mr. Bert Drennen, staff archaeologist.

This office concurs with the statement on Historical and Archaeological Resources in the Draft EIS only as it pertains to off-shore or existing dredged material confinement areas. Upland disposal sites would require archaeological survey to access the impact unless the site has been previously disturbed. The sites designated as Area 1 and Area 3 on the most recent map supplied by your office would require archaeological reconnaissance but Areas 2 and 4 would not. The Detroit District Corps of Engineers is aware of their cultural resource management responsibilities and on-site survey of only the selected disposal site is sufficient for our needs.

Thank you for requesting our comments on the West Harbor project and we would appreciate being informed of the results of any survey.

Sincerely,



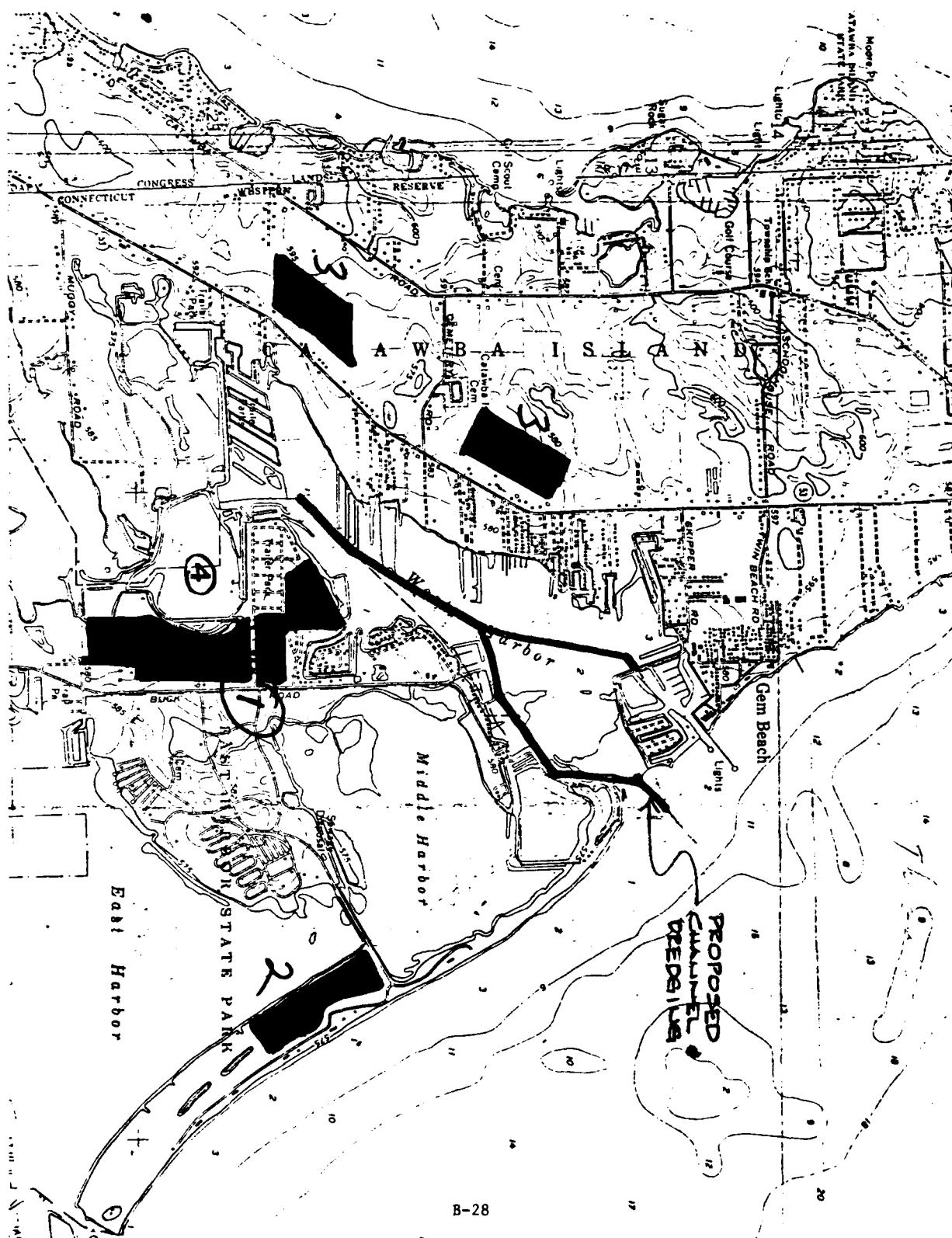
Thomas H. Smith
State Historic Preservation Officer
Director, Ohio Historical Society

THS:BCD:cw
Attachments

X. c: Mr. Les Weigum

Response: An archeological reconnaissance will be conducted at area 1 (agricultural sites). It will be completed during the Phase II planning stage, and coordinated with your office. Area 3 will not be utilized as a disposal site.

Ohio Historic Preservation Office
Ohio Historical Center 1-71 & 17th Avenue Columbus, Ohio 43211 (614) 465-8727
B-27



DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1027
DETROIT, MICHIGAN 48254

MEMORANDUM

18 AUG 1978

Dr. Robert W. Teater
Director, Ohio Department of
Natural Resources
Mountain Square
Columbus, OH 43224

Dear Dr. Teater:

As mentioned to you in my letter of 6 July 1978, the Detroit District had requested the U.S. Fish and Wildlife Service's position regarding parking facilities for the proposed breakwater at West Harbor, Ohio.

I realize your department is interested in the parking facilities, however, Federal law requires the Corps of Engineers to coordinate projects with agencies that have interests in the area. The Fish and Wildlife Service has since informed us that they feel construction of roadways and parking lots at the project is unnecessary and environmentally unsound. In light of this, it is our intention to eliminate the proposed parking facilities from the Phase I General Design Memorandum. This would have no effect upon the fishing walkway which would still be built on the east breakwater.

If I can provide any further information relative to this decision, please contact me.

Sincerely yours,

MELVYN D. REEDS
Colonel, Corps of Engineers
District Engineer



United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

Columbus Field Office
12068 Reynoldsburg Baltimore Road
Pickerington, Ohio 43147

July 20, 1978

Colonel Melvyn D. Remus
U.S. Army Engineer District
Detroit
P.O. Box 1027
Detroit, MI 48231

Dear Colonel Remus:

This is in response to Mr. McCallister's letter dated July 3, 1978 requesting our comments on the Ohio Department of Natural Resources proposal to construct an access road and parking area in the vicinity of the east breakwater near the natural outlet of West Harbor.

We have worked closely with you on the West Harbor Recreational Navigation Project since its inception and have stressed our concerns on how that project would impact fish and wildlife resources in the area. In view of our past comments, and familiarity with the project area, our initial response to this new proposal is to object for environmental reasons.

The development of a parking lot and two-lane highway in the area between West and Middle Harbors would not only destroy fish and wildlife habitat but downgrade the present aesthetics of the area.

The project would directly impact Middle Harbor, which has remained essentially in its natural state in spite of recreational and residential development in East and West Harbors. Middle Harbor has been identified as an area of ecological significance and is a prime sanctuary for waterfowl and wildlife.

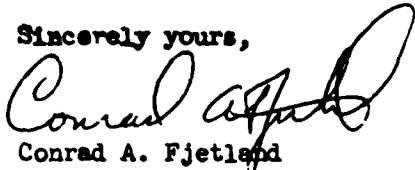
During a recent inspection of the project area we observed four broods of mallard ducks on the sites proposed for construction of the road and parking lot. Past reconnaissance of the channel site (Parking lot) has indicated its importance for fish and waterfowl use.

We recognize that the amount of fill necessary to construct the access road would be minimal. This road project in conjunction with the recreational channel project, however, would produce secondary effects which would reduce the value of the surrounding habitat for fish and wildlife. In addition, the filling of the inlet for construction of the parking lot would have direct adverse impacts.



As we see it, the distance from the East Harbor State Park to the proposed east breakwater at West Harbor is not so great as to require the construction of roadways and parking lots. All things considered, this proposal appears neither necessary nor biologically sound.

If we can be of further assistance, please don't hesitate to call.

Sincerely yours,

Conrad A. Fjetland
Supervisor

CC: Mr. Robert Lucas, Corps of Engineer Liasion ODNR, Fountain Square
Columbus, Ohio 43224
District Engineer, Buffalo Dist. ATTN NCBED-D
Area Manager, FWS, ELAO, East Lansing, MI (ES)

ES:SLEmery:dd

MAR 30 1979



United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

Columbus Field Office
12068 Reynoldsburg Baltimore Road
Pickerington, Ohio 43147

September 6, 1978

Colonel Melvyn D. Remus
U.S. Army Engineer District
Detroit
Post Office Box 1027
Detroit, Michigan 48231

Dear Colonel Remus:

This letter is in reference to the Ohio Department of Natural Resources (ODNR) proposal to construct an access road and parking area for fisherman access to the proposed south breakwater near the natural outlet at West Harbor. We had previously commented on this proposal in a letter sent to you dated July 20, 1978.

Since our first letter, the ODNR has modified their plan. As a result of these changes and additional meetings with the ODNR, we now agree to the construction of a single lane construction access road between the West Harbor natural channel and Middle Harbor provided:

1. The access road is abandoned after construction and closed to vehicular passage.
2. Turn-outs are constructed upland whenever possible and, in no case, more than one turn-out constructed requiring fill. If it is determined that one turn-out will have to be constructed in the water, we recommend that the fill materials be placed in the West Harbor natural channel as opposed to Middle Harbor.
3. If possible, the construction and use of the access road are planned so that waterfowl using the area are not disturbed during the period April 1-July 1. If it is not possible to avoid this season completely, disturbances should be limited to not more than one breeding season.

Sincerely yours,

Kenneth G. Fannen
Conrad A. Fjetland
Supervisor

cc: Mr. Robert Lucas, Corps of Engineers Liasion, ODNR, Columbus, OH
District Engineer, Buffalo Dist., Attn: NCBED-D, Buffalo, NY
Area Manager, FWS, ELAO, East Lansing, MI (ES)

MAR 30 1979



Gilbert/Commonwealth engineers consultants architects

COMMONWEALTH ASSOCIATES INC 209 E Washington Avenue Jackson MI 49201 Tel 517 788 3000

September 20, 1978
62-0146-000

Detroit District
U.S. Army Corps of Engineers
P.O. Box 1027
Detroit, Michigan 48231
Attention: Mr. Les Weigum

SUBJECT: Cultural Resources Survey at the West Harbor Disposal Site

Dear Mr. Weigum:

On September 5, 1978, Dr. James E. Fitting and Dr. Herbert L. Whittier of Commonwealth Associates Inc. carried out an intensive archeological survey of a proposed dump disposal area in the West Harbor Region in northern Ohio. Generally described as the two fields to the west of Ohio Highway 269 across from the entrance to the East Harbor State Park, the exact survey location is shown on the enclosed map. The area had been visited for a reconnaissance survey by Ellen Cummings of the Buffalo District and Michael Pratt, regional representative for the Ohio Historic Preservation Office. Mr. Pratt has informed us that no archeological or historical resources had been previously reported in the general project area.

Conditions for field survey were excellent. Approximately 90 percent of the designated area was planted in soybeans. The beans had not been planted until early August and the crop was generally less than one foot high. The fields to the north and south of the Harbor Acres Trailer Park entrance road had also been cultivated recently.

Test pitting was unnecessary under these conditions and our survey technique was to walk these bean rows at 15 to 20 meter intervals. No prehistoric cultural material was encountered during these excavations and the only historic materials found during the survey were very recent and probably related to dumping and loss from the trailer park and, in the northwest portion of the north dump area nearest to West Harbor, recent flood debris.

Sept 20 1978

Gilbert/Commonwealth Family of Companies:
Reading PA Jackson MI New York NY Rio de Janeiro Brazil Tehran Iran
B-33

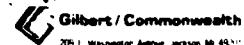
Mr. Les Weigum
September 21, 1978
Page 2

There is a gravel road along the north side of the trailer park which crosses the narrow point of the north survey area and runs, in part, along the north side of the bean field in the corner of Ohio 269 and Harbor Acres Road. The fill for this road consists of limestone fragments which are rather large and which are mixed with blocky chert nodules. Several items which were thought to be blocky cores and/or blocky flakes were found in the bean field within one hundred feet of this road. At first we felt that this might represent a crude lithic industry but this idea was rejected when we noted a) no prepared striking platforms or uniform chipping pattern on the cores, b) found no flakes other than coarse blocky flakes without distinctive striking platforms on positive bulbs of percussion and, c) found no materials which resembled known tool types and no flakes which appeared to have been struck during the manufacture of tools. The concept of a crude lithic industry was abandoned when the source of this questionable material, the crushed rock of the road bed, was located on the margins of the study area.

The extreme southern portion of the survey area was a wet swamp and the areas so marked could not be surveyed. To the north of the swamp, next to Ohio 269, the Schultz Fruit Farm buildings are located, as marked on the map. The Schultz Farm House was apparently constructed in the late nineteenth century. It has a cut granite foundation and limestone lintels on windows which are not arched. While basically Italianate in style, dependencies on the front and rear of the structure have destroyed its classic lines. There is a porte cochere on the west side of the house.

While this house is old enough to be eligible for inclusion on the National Register of Historic Places, Dr. John R. Kern, a Commonwealth Historian, does not feel that it would qualify for nomination on the basis of architectural style since it is a poor vernacular interpretation of a rather common style. The West Harbor area was once an extensive orchard area and this served as the central focus for the orchards so it might be considered to have local historical significance. However, as Dr. Kern has pointed out, it is probably not the earliest structure in the general area and, at best, has marginal significance. A final determination of its eligibility would rest with the State Historic Preservation Officer and depend on the structure's relationship to the State Historic Preservation plan.

MAP 20 1978



Mr. Les Weigum
September 20, 1978
Page 3

The issue of eligibility would be moot if dredge disposal was limited to the fields north of the house. Because of the screening of the existing trees, the proposed activity would have no visual impact, or any other direct or indirect impact on the structure or its contextual setting.

In summary, detailed field and office investigations have indicated that the proposed activity, if limited to the areas currently under cultivation within the specific disposal area, will have no adverse impact on prehistoric cultural resources, since none are present, and no impact on the one potentially historically significant site in the study area.

Sincerely,

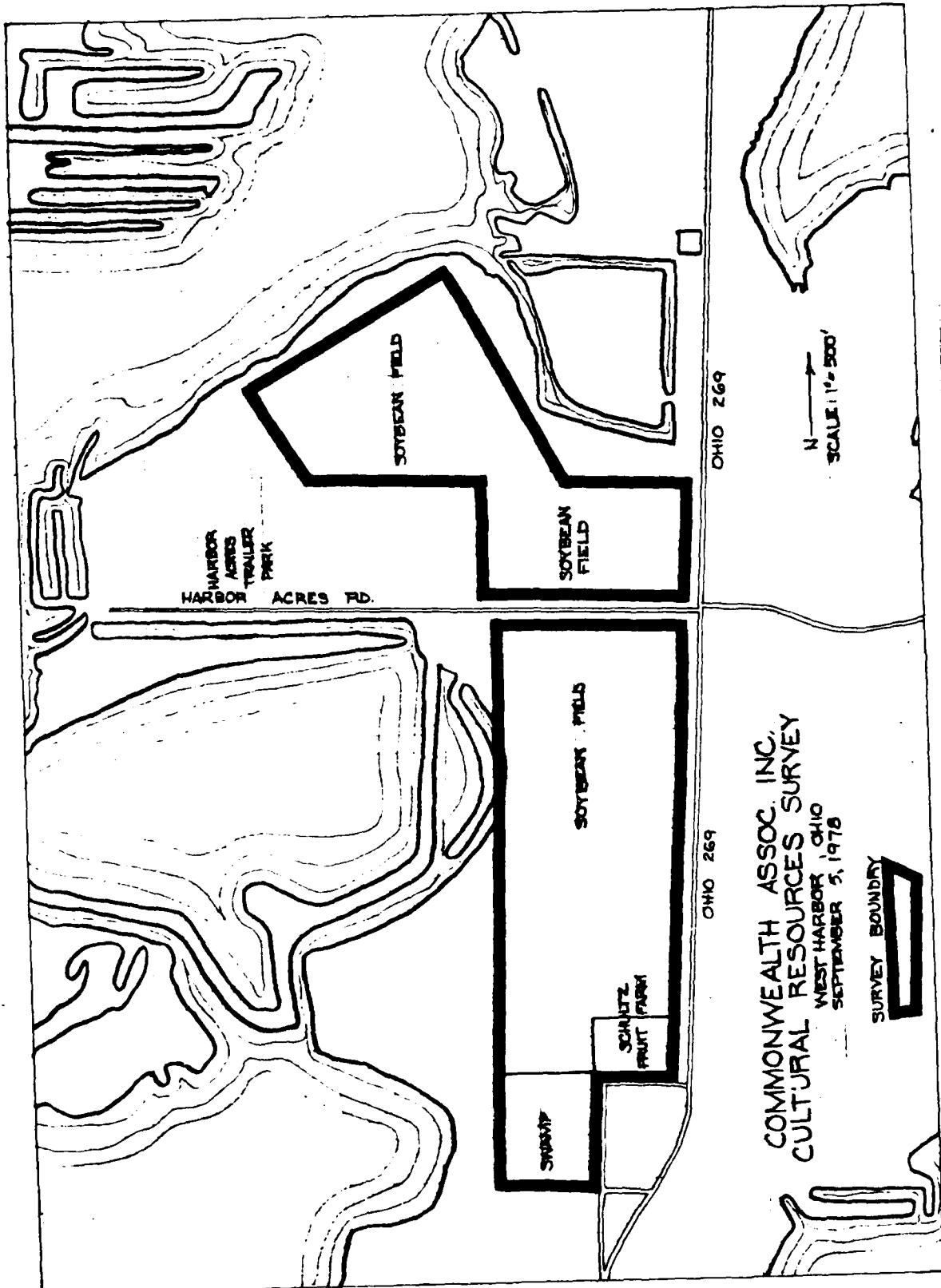
A handwritten signature in black ink, appearing to read "J. E. Fitting".

James E. Fitting, Ph.D.
Manager,
Human Resources Planning Dept.

JEF/ch

MAR 30 1979

B-35



MAR 30 1979

MCBED-PE

9 March 1979

Mr. Michael Pratt
Department of Anthropology
University of Toledo
Toledo, OH 43606

Dear Mr. Pratt:

Enclosed is a copy of the Cultural Resources Survey at the West Harbor Disposal Site, which you requested by telephone, 5 March 1979. We would appreciate your review and comment on this survey.

If the Corps of Engineers can be of further assistance, please contact us.

Sincerely yours,

1 Incl
as stated

DONALD M. LIDDELL
Chief, Engineering Division

MAR 30 1979

NCBED-PE

9 March 1979

Dr. Thomas R. Smith
State Historic Preservation Officer
Director, Ohio Historical Society
Ohio Historic Preservation Office
Ohio Historical Center
I-71 and 17th Avenue
Columbus, OH 43211

Dear Dr. Smith:

Enclosed is a copy of the Cultural Resources Survey at the West Harbor Disposal Site, which was requested to be sent to you by Mr. Michael Pratt, Regional Representative for the Ohio Historic Preservation Office, in a telephone conversation, 5 March 1979.

If the Corps of Engineers can be of further assistance, please contact us.

Sincerely yours,

1 Incl
as stated

DONALD M. LIDDELL
Chief, Engineering Division

B-38

MAR 30 1979

APPENDIX C

Summary of Public Meetings

DEPARTMENT OF THE ARMY
U-TROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

MINUTES OF PREFORMULATION PUBLIC MEETING
IN THE INTEREST OF PROVIDING SHALLOW DRAFT NAVIGATION IMPROVEMENTS
AT WEST HARBOR, OHIO

1. A public workshop was held on 17 February 1976 at the Catawba Island Township Community Hall, Ottawa County, Ohio. The meeting was attended by approximately 225 persons representing Federal, State and Local government, as well as several local marina operators and numerous boating interests.
2. The meeting was opened by Mr. George Platz, Chief, Plan Formulation Section of the Detroit District, Corps of Engineers Office. Mr. Platz explained that the purpose of the meeting was to encourage an interchange of information, generate interest, and solicit opinions of citizens and organizations for an objective reassessment of the authorized navigation project for West Harbor.
3. The meeting was then turned over to Mr. Dale Monteith, Assistant Chief, Plan Formulation Section, Corps of Engineers. Mr. Monteith presented a summary of project activities to-date and of the Corps involvement throughout the study process. Briefly, the presentation encompassed the following items:
 - a. A 1946 preliminary examination report recommended that studies of thirty-three (33) localities on Lake Erie be made in the interest of light-draft navigation. The Chief of Engineers in 1958 authorized a study of West Harbor.
 - b. A Project Plan was developed in 1962 which basically recommended that two (2) arrowhead breakwaters be provided in Lake Erie and that a channel 100 foot wide extending from the ten (10) foot depth contour of Lake Erie into West Harbor be provided. A channel eight (8) feet deep and 80 feet wide would then extend from the outlet into West Harbor proper.
 - c. The project was authorized by the River and Harbor Act of 1965 generally in accordance with recommendations contained in House Document 88-245. Funds to initiate preconstruction planning were subsequently provided in November 1976.
 - d. Project costs for the authorized plan at October 1976 price levels are \$3,590,000. The project has a benefit-cost ratio of 2.3 to 1.0.



e. The Ohio Department of Natural Resources certified its willingness to assure the requirements of local cooperation as set forth in House Document 88-245 on 2 December 1969.

f. The study schedule calls for submission of a Draft Phase I General Design Memorandum (GDM) and Draft Environmental Impact Statement (EIS) in August 1977. The Final Phase I GDM & EIS would be completed in December 1977. The current schedule provides for advertisement of a contract for construction in November 1979. This is predicated on the basis that certain work items for Phase II GDM investigations would be undertaken during the Phase I GDM phase.

4. Mr. Les Weigum, Biologist, Environmental Resources Branch, stated that water qualities and sediment samples have been recently taken at West Harbor. These samples are being analyzed by the Environmental Protection Agency and will be the basis to determine if material to be dredged would need to be confined. Initial inspection indicates that material within West Harbor as well as the material near the Lake Erie outlet may be suitable for open lake disposal.

5. Congressman Delbert L. Latta made a statement indicating a strong desire to shorten the study time-frame such that construction of the project could be undertaken as soon as possible.

6. Mr. Norville Hall, Chief, Division of Ohio Watercraft, read a 17 February 1977 letter from Dr. Teater, Director of the Ohio Department of Natural Resources. Among other things, Mr. Hall read that the ODNR strongly desired that an interim dredging program be undertaken until the permanent project can be constructed. The Ohio DNR's letter strongly supports a permanent project and desires that construction be undertaken as soon as practicable.

7. The following is a list of generalizations and impressions coming out of the comments of those attending the meeting:

a. The general consensus of attendees is that the Corps' Study format is too long a process due to the dire need for shallow-draft navigation improvements.

b. The majority of attendees desire that remedial action at the West Harbor outlet be undertaken. Mr. Monteith explained that upon receipt of a request from a local governmental unit, the Corps of Engineers has the authority to study the potential to provide remedial action by dredging the channel to the conditions that existed prior to project authorization in 1965. Deputy District Engineer, Major Slife, stated that the Ohio DNR letter

dated 17 February 1977 would constitute a request for emergency remedial action. (Field surveys to determine the extent and scope of remedial dredging were initiated by the Detroit District, Corps of Engineers on 28 February 1977.)

c. With the realization that shoaling would be a problem until breakwater structures were built, a local resident suggested that sand be pumped into barges offshore in Lake Erie to reduce potential future shoaling effects until permanent structures are provided.

d. A local resident suggested that the southerly limit of the authorized project in West Harbor be extended southward to the southerly limit of the Harbor.

e. With respect to the potential for utilization of permanent breakwaters for fishing, it was the general consensus of attendees that an attempt be made to provide fishing access to the proposed breakwater east of the natural channel while the west breakwater be precluded from such activity.

f. A local resident suggested that it is the State of Ohio's responsibility to insure safety through the natural channel until the initiation of the construction of the permanent project. The State indicated that they have, in the past, provided emergency dredging works and have provided buoys in the channel outlet.

g. Several local residents indicated that a problem existed at the Ottawa County launching ramp with respect to dredging works. Several local attendees stated that dredging was needed from the ramp to deeper water in West Harbor. The State of Ohio indicated that the Ottawa County Commission has the responsibility for operation and maintenance of the ramp and its dredging, if needed. The County representative disputed the State's contention.

h. Following a general discussion, it was the general consensus of the several marina operators and the Chamber of Commerce in the area that the West Harbor Association organization would be reactivated. Mr. Monteith stated that the Corps of Engineers would meet with the Association to determine what specific aspects of the project they would desire. The Association also indicated that any assistance they could provide the Corps would be readily available and would include an update of boating dockages which exist at the marinas and an estimate of anticipated growth that could be expected in the West Harbor area. These meetings, as necessary, would be subsequently followed by a formal public meeting in October 1977 to discuss a selected plan and its environmental assessments.

j. A Harbor Acres Trailer Park resident submitted a letter stating his belief that the natural channel from West Harbor should be dredged, diked and whatever else is necessary to insure the safety of all boaters at West Harbor.

8. The Corps of Engineers' representatives stated that the Harbor Island water intake is an item of concern since the location of breakwaters could impact upon water quality. The water intake services the residences between Lake Erie and West Harbor and the two West Harbor access channels. Relocation of the intake, if required, would be the responsibility of non-Federal interests as part of the local cooperation requirements. (Discussions with the Harbor Island Contractor on 18 February 1977 reveal that plans exist for the island community to be connected to a central water service system within 3 years.)

6 DEC 1977

DIGEST OF PROCEEDINGS OF THE
PUBLIC MEETING FOR THE PHASE I GENERAL
DESIGN MEMORANDUM STUDY FOR RECREATIONAL BOATING
AT WEST HARBOR (OTTAWA COUNTY), OHIO

1. GENERAL

The public meeting was held on 21 November 1977 by the Deputy District Engineer, Detroit District, Corps of Engineers. The meeting was held at the Catawba Island Township Community Hall, Ottawa County, Ohio. Approximately 50 people were present.

2. Deputy District Engineer, LTC Richard D. Slife, opened the meeting by expressing thanks to Catawba Township for the use of their facilities. He then introduced the State of Ohio and Corps of Engineers personnel in attendance.

3. LTC Slife presented an overview of the project, starting with the history, commenting that the project started in 1958 to determine the merits of providing shallow draft recreational boating in the West Harbor area. He outlined the configuration of the harbor, the shoaling conditions and the need for modification based on the harbor's high recreational use (over 2,600 recreational boats occupy West Harbor). LTC Slife said the project for navigation was recommended in a survey report, and this report was printed in House Document 88-245. In 1965, the West Harbor project was authorized by the Rivers and Harbors Act. However, further funding was not provided until October 1976. Because of the length of time between the initial survey report and the current effort, Congress required a second study to reaffirm the original design and also to update the environmental data. He referenced the public hearing held on February 17, 1977 which was to gain local input into the plan, and then focused on the key environmental issue, which is where to put the dredged material that has been classified as unsuitable for open lake disposal. LTC Slife then turned the meeting over to Mr. Dale Monteith, Project Manager, to address the various alternatives that have been developed.

4. Mr. Monteith gave a slide presentation to show the extensive development at West Harbor. He said plans were developed for various alternatives based on discussions held at the February meeting. Mr. Monteith then explained the alternatives starting with the Natural Channel Plan which follows the original alignment proposed in the House Document developed in 1965. This plan contains a channel along the natural outlet, but provides for an extension of 1,400 feet within

West Harbor. There would be two breakwaters at the outlet and the eastern breakwater would extend to shore, allowing for sport fishing. Total first cost would be approximately \$5.83 million dollars with a benefit cost ratio of 4.23 to 1. It appears to be the plan preferred by the boating interests of the area.

5. Mr. Monteith then explained a second channel alignment that was investigated in the Phase I Study. It consisted of a straight line cut through the Harbor Island area again meeting in the center portion of the harbor with identical access arms both heading north and south within the harbor. It again would have two breakwaters. The easterly one would be connected to shore and the estimated total first cost is slightly higher at 5.86 million dollars. It has a benefit cost ratio of 4.2 to 1. It would entail going through an area that's considered to have some aquatic habitat, such that it would create some environmental problems.

6. A third channel alignment that was investigated was to improve the outlet through the existing Gem Beach Channel in lieu of improvements along the natural outlet. The plan would not have sport fishing facilities provided due to the local development within both areas immediately surrounding the Gem Beach Harbor where breakwaters would be located. The cost of this plan is slightly less at \$5,125,000 with the benefit cost ratio being approximately 4.6 to 1. It is an alignment that is preferred by the U.S. Fish and Wildlife Service.

7. The plan the Corps feels most adequately meets the needs of the public in the West Harbor area is the first alternative presented. Several potential sites for placement of that dredged material have been suggested. The Corps has met with the Ohio Department of Natural Resources, U.S. Fish and Wildlife Service, and the U.S. Environmental Protection Agency to evaluate potential sites. Sites which appear to be acceptable for placement of inner harbor material consist of a 36 acre area of East Harbor State Park and two farm areas of 42 acres and 55 acres near the southeast corner of West Harbor. Material to be dredged from the outer harbor area would be distributed along the East Harbor State Park shoreline for beach nourishment.

8. LTC Slife explained that the Corps would seek a local sponsor to provide the items of local cooperation. The cost breakdown between the Federal Government and the local sponsor is equally shared for the general navigation facilities. The local sponsor would provide the rights-of-way, holding the Federal Government harmless from damages. A public body

would be needed to regulate the growth of the harbor, provide public access, construct and maintain channels from marinas to the Federal channels, contribute half the cost of the structures associated with sport fishing, maintain facilities developed for sport fishing and, if needed, provide mitigating measures to prevent degraded water quality at the Harbor Island water intake.

9. STATEMENTS

Statements presented during the session are summarized in the following paragraphs:

a. Norville L. Hall, Chief of the Division of Watercraft of the Ohio Department of Natural Resources, made the following statement on behalf of the Ohio Department of Natural Resources, a prospective non-Federal sponsor of the proposed harbor improvement project. Mr. Hall stated the need for the project, and expressed hope that a disposal area would be agreed upon for the dredge spoil. He also stated concern regarding the possible increased cost associated with placing the spoil in areas considered to have the least environmental impact. Funds are limited for the non-Federal share of the project and any great increase in cost would place the project beyond the ability of the State of Ohio to insure non-Federal funds. He also stated that the Ottawa County Commissioners appeared to be a public body that presently exists that is empowered to regulate the use, growth, and free development of all lands within the county. He also expressed a need for clarification by the Corps of Engineers to specifically identify which areas are considered to be "to principal docks and in berthing areas" for maintenance of channel depths.

b. Mr. Lewis Rankin, an attorney from Columbus, Ohio, and the Legislative Officer of the Columbus Power Squadrons stated the Power Squadrons concern with the disposal of the dredged material. He would like to see an agreement soon as to where to put the dredged material so that the project can get started.

c. Mr. Tom Corogin, attorney for the Harbor Park Marina, stated that the Harbor Park Marina is developing land in the area and would like to have the dredged material from the project used as land fill.

10. DISCUSSION

a. Mr. Dwight Buchholtz asked why the study was taking so long. LTC Slife explained the procedure the Corps must take for each study before construction can begin.

b. Mr. Floyd McCullough, owner of the West Harbor Lagoons Mobile Home Park and a marine contractor, asked if the dredged material being placed on the State park land would be an enlargement of the one that was made back approximately 15 years ago. Mr. Monteith said the dredged material would be placed on the area where previous material has been placed.

c. Mr. Thomas from Worthington, Ohio, expressed his concern that the local authorities would not be able to appropriate the money for their share of the project. Mr. Hall from the Ohio Department of Natural Resources stated that \$1.5 million has been appropriated for the project.

d. Mr. Lewis Rankin asked if there was a problem with getting a local sponsor for the project. LTC Slife said that the State had indicated that this is a high priority project; however, local sponsorship could still be a problem. Mr. Rankin then expressed his concern with where the dredged material would be placed.

e. Mr. Don Orrick from Worthington, Ohio, asked whether the Corps must abide by what the Fish and Wildlife and Environmental Protection Agency stipulate. LTC Slife said that the Corps is more or less mandated by law to abide by their determinations.

f. Mr. Dwight Buchholtz said that at the February meeting, the County Commissioners tried to wash their hands of the channel and the upkeep of it. LTC Slife said that the Corps would explore the County Commissioners' position when we have an opportunity to meet with them and the State in the near future.

g. Mr. Charlie Grant, Harbor Island, thought that the north wing on the breakwater should be connected to the shore. He said the channel would fill in right at that area if it were not connected. Mr. Monteith said the basic movement of the sand through that area is from east to west, and that it is felt that the breakwater is not needed to be connected to shore.

h. Mr. John Moore, Catawba, asked if the letter that was sent to the County Commissioners had any dollar figures as

to what it would cost the local sponsor. Mr. Monteith said that the letter indicates cost figures as presented in the Draft Phase I General Plan, or planning Report. Mr. Moore was concerned as to how much the local sponsors would have to contribute to the project. Mr. Monteith stated that final figures would not be available until the time of construction.

i. Mr. Dwight Kuehne, asked what happens if the local sponsor does not have the money in one lump-sum. LTC Slife said that if the local sponsor signs the assurances, it is on the basis that there are available funds which would be supplied when required.

j. Mr. Bill Danner, Westoria, Ohio, asked if the State was still reluctant to provide interim dredging with the Federal Government to the West Harbor channel to keep it open for boaters. Mr. Slife said that since Congress has not yet passed amendments to Section 221 of the 1970 Rivers and Harbors Act, which requires that States commit themselves to continuing maintenance of emergency projects until a permanent project is completed, the State would be unable to legally cooperate with the Corps in getting the dredging of the channel done.

k. Mr. Thomas Hotzel, Catawba, Ohio, asked about the opening of the outermost breakwater entrance and its relationship to the 100 foot wide channel. Mr. Monteith said the proposed width between the breakwaters at their outer ends is 200 feet. The channel's width would go between the two breakwaters has a bottom width of 100 feet. There will be some side slopes however, but essentially it would not extend from point to point of the two breakwaters.

11. CONCLUSIONS

LTC Slife concluded the meeting by stating his appreciation to all who attended the meeting and that any other comments could be addressed to him by letter.

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D-3	ESTIMATE OF FIRST COST AND ANNUAL CHARGE	D-4
D-4	SUMMARY OF BENEFITS	D-5

APPENDIX D

Summary of Economic Data

TABLE D-1
SUMMARY OF ESTIMATED FIRST COSTS

Item	July 1962 Authorization Estimate \$	October 1978 Latest Approved PB-3 \$	Phase I GDM Estimate \$	Cost Difference Due to Price Level		Cost Difference Due to Other Changes \$	Explanation of other Changes
				Cost Difference Due to Price Level \$	Other Changes \$		
a. Project First Costs:							
Channels	430,000	3,991,000	3,988,000	+ 976,000	+ 2,582,000	Inc. in channel length & quantities	
Breakwaters	555,000	1,480,000	1,280,000	+1,260,000	- 535,000	Longer south breakwater & price level decrease	
Recreation Facilities	0	102,000	0	0	0	Elim. of breakwater fishing	
Dike Disposal	0	89,000	89,000	0	+ 89,000	Addition of containment areas	
Engineering & Design	30,000	350,000	295,000	+ 68,000	+ 197,000	Constr. cost increase & percentage decrease	
Super. & Administration	<u>73,000</u>	<u>308,000</u>	<u>268,000</u>	+ <u>166,000</u>	+ <u>29,000</u>	Construction cost increase & percentage decrease	
Gross Construction Cost	1,088,000	6,320,000	5,920,000	+2,470,000	+2,362,000		
b. Federal Costs:							
Net Constr. Cost	544,000	3,110,000	2,686,000	+1,235,000	+ 907,000		
Navigation Aids	<u>13,600</u>	<u>86,000</u>	<u>86,000</u>	+ <u>20,000</u>	+ <u>41,500</u>	Additional channel markers and refined prices	
Total First Costs	571,600	3,196,000	2,772,000	+ 1,265,000	+ 948,500		
c. Non-Federal Costs:							
Channel & Berthing Areas	60,000	450,000	450,000	+ 136,000	+ 254,000	Increase in quantity	
Dike Disposal	0	98,000	98,000	0	+ 98,000	Addition of containment area	
Cost Contribution	<u>564,000</u>	<u>3,112,000</u>	<u>2,686,000</u>	+ <u>1,235,000</u>	+ <u>907,000</u>		
Total Non-Federal First Costs	<u>604,000</u>	<u>3,660,000</u>	<u>3,234,000</u>	+ <u>1,371,000</u>	+ <u>1,259,000</u>		
Total Federal & Non Federal Costs	1,161,600	6,856,000	6,006,000	+ 2,636,900	+ 2,207,500		
						MAR 30 1973	

TABLE D-2

ESTIMATE OF FIRST COST
SELECTED PLAN

<u>Item</u>	<u>Quantity and Unit</u>	<u>Unit Cost</u>	<u>Amount</u>	<u>Total</u>
Channels				
Dredging	397,900 C.Y.	\$ 3.30	\$1,273,300	
	292,600 C.Y.	7.50	2,194,500	
Contingencies				
			520,200	
Sub-Total (Channels)				
				\$3,988,000
Breakwaters				
Steel Sheet				
Piling				
Type S-28	4,500 S.F.	11.00	49,500	
Type Z-27	66,000 S.F.	10.00	660,000	
Dredged Cell	700 C.Y.	8.50	6,000	
Fill				
Quarry Stone				
1410-2825 Lb.	7,050 Tons	27.00	190,350	
125- 190 Lb.	2,075 Tons	18.00	37,350	
1- 70 Lb.	12,100 Tons	14.00	169,400	
Contingencies				
			167,400	
Sub-Total (Breakwaters)				
				\$1,280,000

TABLE D-2
ESTIMATE OF FIRST COST
SELECTED PLAN

<u>Item</u>	<u>Quantity and Unit</u>	<u>Unit Cost</u>	<u>Amount</u>	<u>Total</u>
<u>Diked Disposal Areas</u>				
Earth Dike	15,750 C.Y.	\$.80	\$ 12,600	
Weir Outlet & Oil Skimmer	3 Ea.	\$21,500	64,500	
Contingencies			11,900	
Sub-Total (Diked Disposal Areas)				\$ 89,000
Total Construction Cost				5,357,000
Engineering and Design				295,000
Supervision and Administration				<u>268,000</u>
Gross Construction Cost				5,920,000
Aids to Navigation				<u>86,000</u>
FIRST COSTS				\$6,006,000

TABLE D-3
ESTIMATE OF FIRST COST AND ANNUAL CHARGE
SELECTED PLAN

<u>Item</u>	<u>Total Cost</u>	<u>Federal Cost</u>	<u>Non-Federal Cost</u>
<u>First Costs</u>			
Channels ¹	\$ 3,988,000		
Engineering & Design ²	220,000		
Supervision & Administration ³	<u>200,000</u>		
Sub-Total (Channels)	\$ 4,408,000	\$ 1,979,000	\$ 2,429,000 <u>1/</u>
Breakwaters ¹	1,280,000		
Engineering & Design ²	70,000		
Supervision & Administration ³	<u>64,000</u>		
Sub-Total (Breakwaters)	\$ 1,414,000	\$ 707,000	\$ 707,000
Diked Disposal Area ¹	89,000		
Engineering & Design ²	5,000		
Supervision & Administration ³	<u>4,000</u>		
Sub-Total (Diked Disposal Area)	\$ 98,000	\$ 0	\$ 98,000
Gross Construction Cost	\$ 5,920,000	\$ 2,686,000	\$ 3,234,000
Aids to Navigation (USCG)	<u>86,000</u>	<u>86,000</u>	<u>0</u>
TOTAL PROJECT 1st COSTS	\$ 6,006,000	\$ 2,772,000	\$ 3,234,000

1/ Includes \$450,000 for dredging channels and berthing areas beyond the Federal channel limits.

Annual Charges

Interest @ 3-1/4%	\$ 195,200	\$ 90,000	\$ 105,200
Amortization - 50 yrs.	49,500	22,700	26,800
Maintenance	<u>45,300</u>	<u>45,300</u>	<u>0</u>
TOTAL AVERAGE ANNUAL CHARGES	\$ 290,000	\$ 158,000	\$ 132,000

¹ Includes 15 percent for contingencies.

² Estimated at 5.5 percent.

³ Estimated at 5.0 percent.

TABLE D-4
SUMMARY OF BENEFITS

<u>Type of Benefit</u>	<u>Equivalent Annual Benefit</u>	<u>Allocation of Benefit</u>	
		<u>General</u>	<u>Local</u>
Recreational Craft:			
Present locally-based boats	\$ 471,900		
New locally-based boats added because of natural growth	\$ 2,700		
New Locally-based boats added because of improvement	\$ 571,900		
Boats transferred to West Harbor after improvement	\$ 62,400		
Trailer-drawn boats	\$ 12,900		
Transient boats added after improvement	\$ 21,700		
Sub-Total (Recreational Craft)	\$ 1,143,500		
Reduction in boat damage:	\$ 52,500		
Value as a harbor of refuge:	\$ 10,000		
TOTAL AVERAGE ANNUAL BENEFITS	\$ 1,206,000	\$603,000	\$603,000

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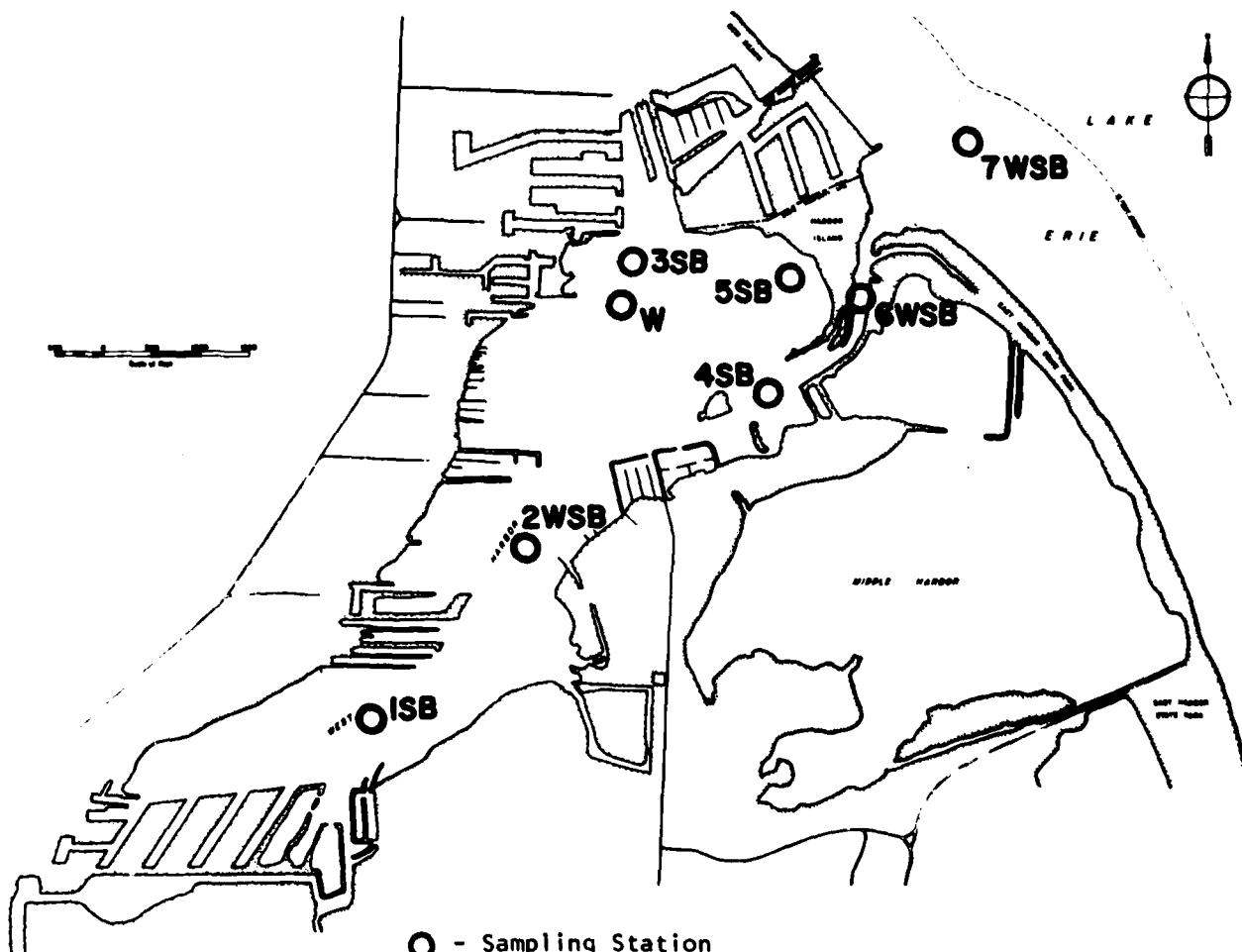
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APPENDIX E

Supplemental Data



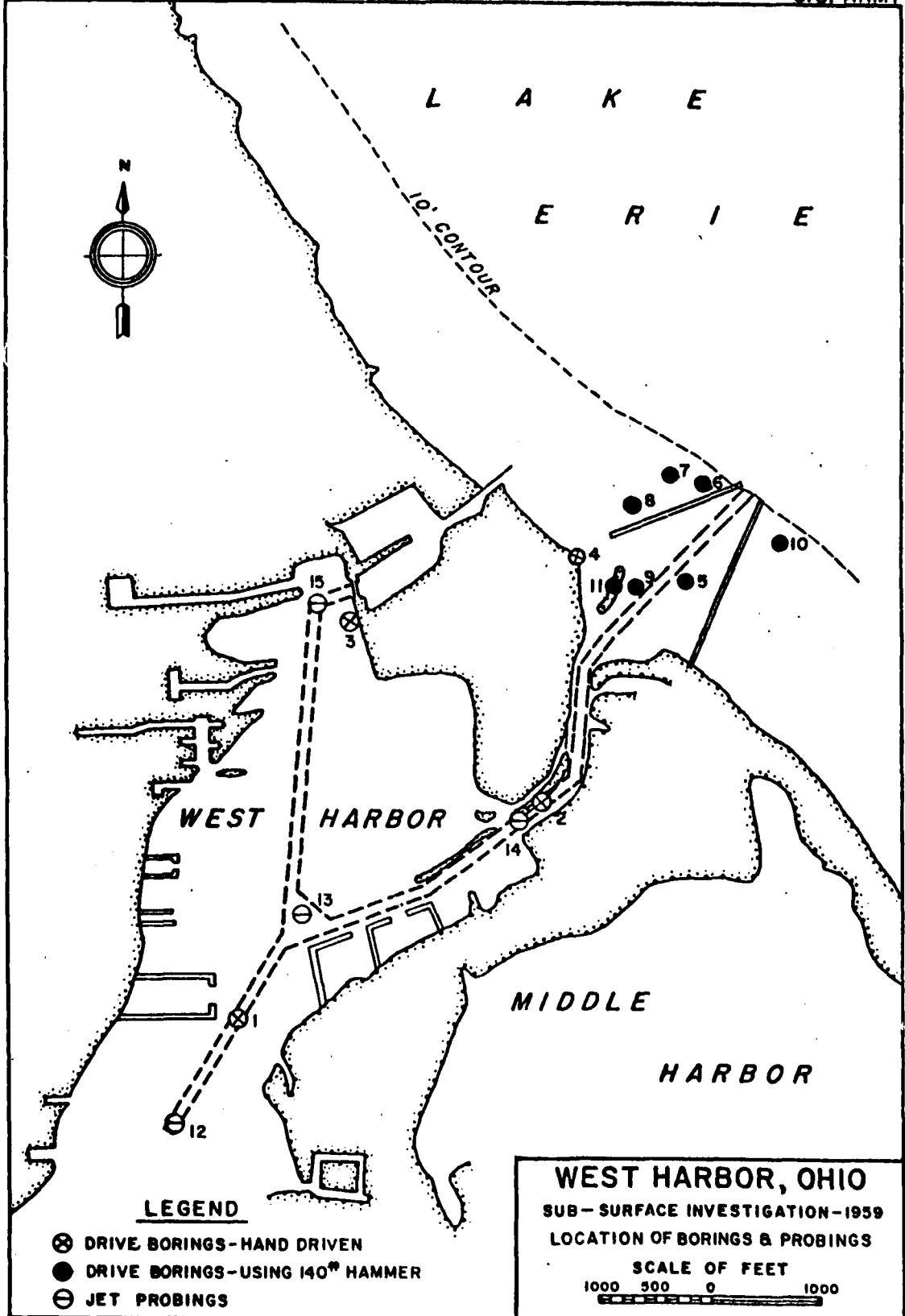
○ - Sampling Station

WSB - Water, Sediment and Benthos Sampling Station

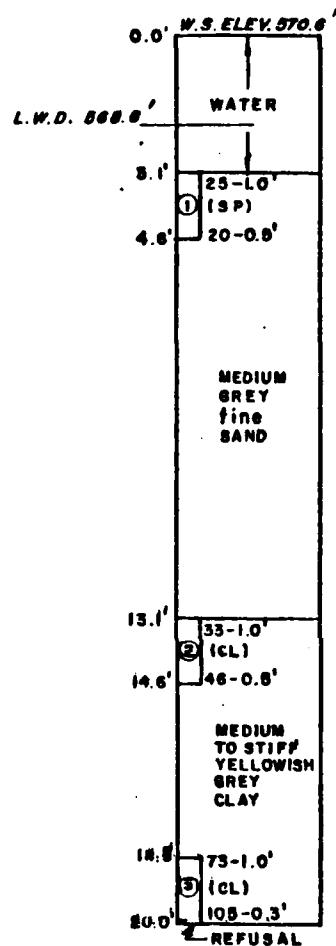
SB - Sediment and Benthos Sampling Station only

W - Water Sampling Station only

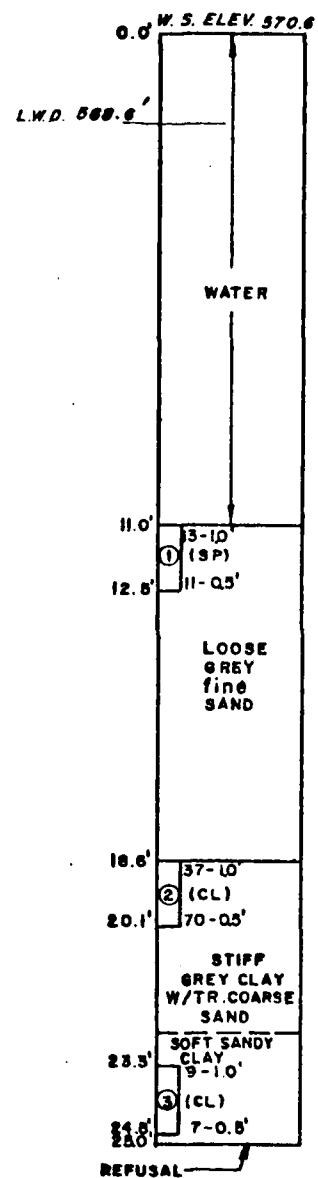
FIGURE E-1 - WATER SAMPLING SITES



HOLE No.5

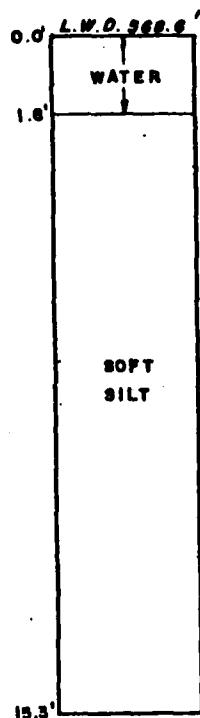


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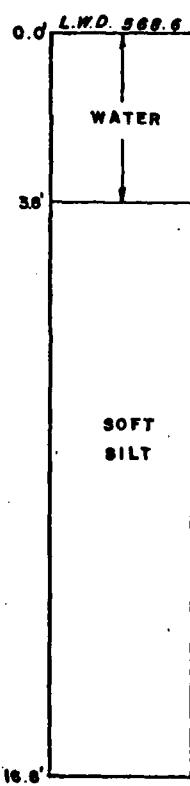


WEST HARBOR OHIO
SUB-SURFACE
INVESTIGATION-1959
LOG OF DRIVE BORINGS
SCALE OF DEPTH: 1" = 4'

HOLE No.13



HOLE No. 14



WEST HARBOR OHIO
SUB-SURFACE
INVESTIGATION - 1959
LOG OF DRIVE BORINGS
SCALE OF DEPTH: 1" = 4'

TABLE E-1
BENTHIC MACROINVERTEBRATE FAUNA OF WEST HARBOR

Organism	No. of Organisms/Meter ² by Station						
	1	2	3	4	5	6	7
1. Oligochaeta							
Tubificidae							
<u>Branchiura sowerbyi</u>		38				19	
<u>Limnodrilus cervix</u>						38	
<u>Limnodrilus hoffmeisterei</u>	95	190	171	19		38	
<u>Limnodrilus maumensis</u>		95					
<u>Potamothrix vejvodskyi</u>						76	
2. Unidentified immatures with capilliform chaetae							19
3. Insecta							
Diptera							
Chironomidae							
Tanypodinae							
<u>Coelotanypus</u> sp.	19	76	114			57	
<u>Procladius</u> sp.		133	76	19	190		
<u>Tanypus</u> sp.	19						
Chironominae							
<u>Chironomus plumosus</u>	38	38	133			19	
<u>Chironomus</u> sp.		19	19				
<u>Cryptochironomus</u> sp.		19	19	19	19		
<u>Polypedilum</u> sp.					247		
<u>Pseudochironomus</u> sp.							19
Ceratopogonidae							
<u>Palpomyia tibialis</u>		19	19		19		
TOTAL NUMBER OF ORGANISMS PER SQUARE METER	171	627	551	304	475	38	0
TOTAL NUMBER OF TAXA	4	9	7	4	9	2	0

TABLE E-2
FISH SPECIES LIKELY TO FREQUENT THE WEST HARBOR VICINITY ^{1/}

Common Name	Scientific Name	Spawning Period	Time of Greatest Abundance in West Harbor Area
Yellow Walleye	<u>Stizostedion vitreum</u> <u>vitreum</u>	mid-April to early May	August
Yellow Perch	<u>Perca flavescens</u>	mid-April to May	April
White Bass	<u>Morone chrysops</u>	May in tributaries, June along offshore reefs	April-May
Freshwater Drum	<u>Aplodinatus grunniens</u>	May-August	June-July
Rainbow Smelt	<u>Osmerus mordax</u>	April-May	
Alewife	<u>Alosa pseudoharengus</u>	June-July	
Gizzard Shad	<u>Alosa sapidissima</u>	May-June	
Channel Catfish	<u>Ictalurus punctatus</u>	July-August	
Brown Bullhead	<u>Ictalurus nebulosus</u>	April-May	
Carp } plus Goldfish } Hybrids	<u>Cyprinus carpio</u> <u>Carassius auratus</u>	May-June	
Trout-Perch	<u>Percopsis omiscomaycus</u>	May-June	
Emerald Shiner	<u>Notropis atherinoides</u> <u>atherinoides</u>	June-July	
Spottail Shiner	<u>Notropis hudsonius</u>	late June to mid-August	
		April-May	

TABLE E-2 (Cont.)
FISH SPECIES LIKELY TO FREQUENT THE WEST HARBOR VICINITY 1/

Common Name	Scientific Name	Spawning Period	Time of Greatest Abundance in West Harbor Area
White Crappie	<u>Pomoxis annularis</u>	June-July	
Black Crappie	<u>Pomoxis nigromaculatus</u>	June-July	
Sauger	<u>Stizostedion canadense</u>	April-early May	
Logperch	<u>Percina caprodes semi-fasciata</u>	May-June	
Smallmouth Blackbass	<u>Micropterus dolomieu dolomieu</u>	mid-May - June	May
Stonecat Madton	<u>Noturus flavus</u>	June-July	
Quillback	<u>Carpoides cyprinus cyprinus</u>	April-May	
Longnose Gar	<u>Lepisosteus osseus</u>	April-May	
Bluegill	<u>Lepomis macrochirus</u>	May-June	
Green Sunfish	<u>Lepomis cyanellus</u>	late April-June	
Pumpkinseed Sunfish	<u>Lepomis gibbosus</u>	April-June	
Spotfin Shiner	<u>Notropis spilopterus</u>	April-May	

1/ Based in part on surveys conducted by the Ohio Division of Wildlife, Lake Erie Fish Research Unit and the U.S. Fish and Wildlife Service, and on records of commercial fish catches in Lake Erie.

Additional references:

1. Ohio Department of Natural Resources, Division of Wildlife: "Lake Erie Fisheries Investigations". Dingell-Johnson Project No. F-35-R-13, May, 1975.
2. Ohio Department of Natural Resources, Division of Wildlife: "Lake Erie Fisheries Investigations". Dingell-Johnson Project No. F-35-R-14, March, 1976.
3. Trautman, Milton B.: The Fishes of Ohio. Ohio State University Press, Columbus, Ohio, 1957.
4. Langlois, Thomas H.: The Western End of Lake Erie and Its Ecology. J.W. Edward Fisher, Inc., Ann Arbor, Michigan, 1954.

TABLE E-3

MARSH AND AQUATIC VASCULAR FLORA
OCCURRING IN THE PROJECT AREA 1/

Taxa	Status In The Project Area
Typhaceae <u>Typha angustifolia</u> L. <u>Typha latifolia</u> L.	abundant rare
Sparganiaceae <u>Sparganium eurycarpum</u> Engelm.	abundant
Potamogetonaceae <u>Potamogeton crispus</u> L. <u>Potamogeton foliosus</u> Raf. <u>Potamogeton pectinatus</u> L. <u>Potamogeton zosteriformis</u> Fern.	abundant common abundant rare
Najadaceae <u>Najas flexilis</u> (Willd.) Rostk & Schmidt <u>Najas minor</u> All.	rare common
Alismataceae <u>Alisma plantago-aquatica</u> L. <u>Lophotocarpus calycinus</u> (Engelm.) J.G. Sm. <u>Sagittaria latifolia</u> Willd. <u>Sagittaria rigida</u> Pursh.	abundant abundant abundant rare
Butomaceae <u>Butomus umbellatus</u> L.	common
Hydrocharitaceae <u>Elodea canadensis</u> Michx. <u>Vallisneria americana</u> Michx.	rare abundant
Gramineae <u>Calamagrostis canadensis</u> (Michx.) Nutt. <u>Echinochloa crusgalli</u> (L.) Beauv. <u>Echinochloa pungens</u> (Poir.) Rydb. <u>Echinochloa walteri</u> (Pursh) Nash <u>Eragrostis hypnoides</u> (Lam.) BSP. <u>Glyceria striata</u> (Lam.) Hitchc. <u>Leersia oryzoides</u> (L.) Sw. <u>Lolium</u> sp. <u>Phalaris arundinacea</u> L. <u>Phragmites australis</u> (Cav.) Steud. <u>Spartina pectinata</u> Link	common occasional occasional common common common abundant common common common common

TABLE E-3 (Cont.)

MARSH AND AQUATIC VASCULAR FLORA
OCCURRING IN THE PROJECT AREA 1/

Taxa	Status In The Project Area
Cyperaceae	
<i>Carex acutiformis</i> (Bl.) Kuntz.	common
<i>Carex atherodes</i> Spreng.	rare
<i>Carex blanda</i> Dewey	rare
<i>Carex comosa</i> Boott.	rare
<i>Carex davisii</i> Schle. & Torr.	rare
<i>Carex frankii</i> Kunth.	rare
<i>Carex garberi</i> Fern.	common
<i>Carex granularis</i> Willd.	common
<i>Carex haydenii</i> Dewey	rare
<i>Carex hystericina</i> Willd.	occasional
<i>Carex lacustris</i> Willd. var. <i>laxiflora</i> Dewey	rare
<i>Carex laevigata</i> (Kunth.) Mackenz.	rare
<i>Carex liguinosa</i> Michx.	occasional
<i>Carex lupulina</i> Willd.	rare
<i>Carex muscina</i> Mensis Schw.	rare
<i>Carex stipata</i> Muhl.	common
<i>Carex vulpinoidea</i> Michx.	common
<i>Cyperus diandrus</i> Torr.	common
<i>Cyperus engelmannii</i> Steud.	common
<i>Cyperus erythrorhizos</i> Muhl.	common
<i>Cyperus esculentus</i> L.	common
<i>Cyperus ferrugineus</i> Boeckl.	common
<i>Cyperus rivularis</i> Kunth.	abundant
<i>Cyperus strigosus</i> L.	common
<i>Eleocharis erythropoda</i> Steud.	common
<i>Eleocharis obtusa</i> (Willd.) Schultes	common
<i>Eleocharis ovata</i> (Roth.) R. & S.	common
<i>Eleocharis smallii</i> Britt.	common
<i>Scirpus acutus</i> Muhl.	common
<i>Scirpus americanus</i> Pers.	occasional
<i>Scirpus atrovirens</i> Willd.	common
<i>Scirpus fluviatilis</i> (Torr.) Gray	abundant
<i>Scirpus validus</i> Vahl.	common
Juncaceae	
<i>Juncus alpinus</i> Vill.	common
<i>Juncus alpinus</i> Vill. var. <i>rariflorus</i> Hartn.	occasional
<i>Juncus articulatus</i> L.	rare
<i>Juncus balticus</i> Willd. var. <i>littoralis</i> Engelm.	occasional
<i>Juncus dudleyi</i> Wieg.	common
<i>Juncus effusus</i> L.	common
<i>Juncus nodosus</i> L.	common

TABLE E-3 (Cont.)

MARSH AND AQUATIC VASCULAR FLORA
OCCURRING IN THE PROJECT AREA 1/

Taxa	Status In The Project Area
Juncaceae (continued) <i>Juncus torreyi</i> Cov. <i>Juncus torreyi</i> Cov. x <i>J. alpinus</i> Vill.	common occasional
Iridaceae <i>Iris versicolor</i> L.	common
Salicaceae <i>Salix interior</i> Rowlee <i>Salix nigra</i> Marsh <i>Salix rigida</i> Muhl. <i>Populus deltoides</i> Marsh	abundant common occasional abundant
Lemnaceae <i>Lemna minor</i> L. <i>Lemna trisulca</i> L. <i>Spirodela polyrhiza</i> (L.) Schleid <i>Wolffia columbiana</i> Karst.	abundant occasional common occasional
Pontederiaceae <i>Heteranthera dubia</i> (Jacq.) MacM. <i>Pontederia cordata</i> L.	rare common
Urticaceae <i>Boehmeria cylindrica</i> (L.) Sw. <i>Pilea pumila</i> (L.) Gray	common occasional
Polygonaceae <i>Polygonum coccineum</i> Muhl. <i>Polygonum lapathifolium</i> L. <i>Polygonum pensylvanicum</i> L. <i>Polygonum pensylvanicum</i> L. var. <i>eglandulosum</i> J.C.Myers <i>Polygonum persicaria</i> L. <i>Polygonum punctatum</i> Ell. <i>Polygonum scandens</i> L. <i>Polygonum virginianum</i> L. <i>Rumex verticillatus</i> L.	common abundant common rare occasional common common occasional rare
Chenopodiaceae <i>Atriplex patula</i> L.	rare
Ceratophyllaceae <i>Ceratophyllum demersum</i> L.	common

TABLE E-3 (Cont.)

MARSH AND AQUATIC VASCULAR FLORA
OCCURRING IN THE PROJECT AREA 1/

Taxa	Status In The Project Area
Onagraceae <u>Epilobium hirsutum</u> L. <u>Ludwigia palustris</u> (L.) Ell. <u>Ludwigia polycarpa</u> Short & Peter	common occasional rare
Haloragidaceae <u>Myriophyllum exalbescens</u> Fern.	abundant
Umbelliferae <u>Sium suave</u> Walt.	common
Primulaceae <u>Lysimachia nummularia</u> L. <u>Lysimachia thyrsiflora</u> L.	occasional rare
Cornaceae <u>Cornus drummondii</u> Meyer <u>Cornus stolonifera</u> Michx.	abundant common
Asclepiadaceae <u>Asclepias incarnata</u> L.	common
Verbenaceae <u>Lippia lanceslata</u> Michx. <u>Verbena hastata</u> L. <u>Verbena urticifolia</u> L.	common common occasional
Labiatae <u>Lycopus asper</u> Greene <u>Lycopus europaeus</u> L. <u>Lycopus uniflorus</u> Michx. <u>Mentha arvensis</u> L. <u>Monarda fistulosa</u> L. <u>Physotegia virginiana</u> (L.) Benth. <u>Scutellaria epilobiifolia</u> A. Hamilton <u>Scutellaria lateriflora</u> L. <u>Stachys palustris</u> L. <u>Stachys palustris</u> L. var. <u>pilosa</u> (Nutt.) Fern.	occasional common occasional occasional occasional occasional abundant abundant common occasional
Solanaceae <u>Solanum dulcamara</u> L. <u>Solanum nigrum</u> L.	common common

TABLE E-3 (Cont.)

MARSH AND AQUATIC VASCULAR FLORA
OCCURRING IN THE PROJECT AREA 1/

Taxa	Status In The Project Area
Nymphaeaceae <u>Nelumbo lutea</u> (Willd.) Pers. <u>Nuphar advena</u> (Ait.) Ait. <u>Nuphar variegatum</u> Engelm. <u>Nymphaea tuberosa</u> Paine	common rare Occasional rare
Ranunculaceae <u>Ranunculus longirostris</u> Godr. <u>Ranunculus sceleratus</u> L.	rare common
Cruciferae <u>Cardamine bulbosa</u> (Schreb.) BSP. <u>Cardamine pensylvanica</u> Muhl. <u>Rorippa palustris</u> (L.) Bess. var. <u>fernaldiana</u> (Butt. & Abbe.) Stuckey <u>Rorippa palustris</u> (L.) Bess. var. <u>hispida</u> (Desv.) Gray <u>Rorippa sylvestris</u> (L.) Bess.	rare common common common rare
Saxifragaceae <u>Penthorium sedoides</u> L.	common
Rosaceae <u>Potentilla palustris</u> (L.) Scop. <u>Potentilla anserina</u> L. <u>Rosa palustris</u> Marsh	rare occasional occasional
Leguminosae <u>Strophostyles helvola</u> (L.) Ell.	common
Euphorbiaceae <u>Acalypha rhomboidea</u> Raf.	common
Balsaminaceae <u>Impatiens capensis</u> Merrb.	abundant
Malvaceae <u>Hibiscus palustris</u> L.	common
Gutierreziae <u>Hypericum punctatum</u> Lam.	occasional
Lythraceae <u>Decodon verticillatus</u> (L.) Ell. <u>Lythrum dacotanum</u> Niew. <u>Lythrum salicaria</u> L.	common common occasional

TABLE E-3 (Cont.)

MARSH AND AQUATIC VASCULAR FLORA
OCCURRING IN THE PROJECT AREA 1/

Taxa	Status In The Project Area
Serpophylariaceae <u>Gerardia purpurea</u> L. <u>Gerardia tenuifolia</u> Vahl. <u>Gratiola neglecta</u> Torr. <u>Lindernia dubia</u> (L.) Pennell <u>Mimulus ringens</u> L. <u>Lindernia dubia</u> (L.) Michx.) Benth.	common occasional common common common common
Lentibulariaceae <u>Utricularia vulgaris</u> L.	common
Rubiaceae <u>Cephalanthus occidentalis</u> L. <u>Houstonia nigricans</u> (Lam.) Fern.	common common
Caprifoliaceae <u>Sambucus canadensis</u> L.	common
Cucurbitaceae <u>Echinocystis lobata</u> (Michx.) T. & G. <u>Sicyos angulata</u> L.	rare occasional
Campanulaceae <u>Campanula aparinoides</u> Pursh. <u>Lobelia kalmii</u> L. <u>Lobelia siphilitica</u> L.	rare rare occasional
Compositae <u>Bidens bipinnata</u> L. <u>Bidens cernuus</u> L. <u>Bidens comosa</u> (Gray) Wieg. <u>Bidens connata</u> Muhl. <u>Bidens coronata</u> (L.) Britton <u>Bidens frondosa</u> L. <u>Bidens heterodoxa</u> (Fern.) Fern. & St. John <u>Bidens vulgata</u> Greene <u>Boltonia asteroides</u> (L.) L'Her <u>Eclipta alba</u> (L.) Hassk. <u>Erechtites hieracifolia</u> (L.) Raf. <u>Solidago graminifolia</u> (L.) Salisb.	occasional abundant common common common common rare occasional occasional common rare common

1/ Moore, David L.: "Changes in the Marsh and Aquatic Vascular Flora of East Harbor State Park, Ottawa County, Ohio, Since 1895." Ohio Journal of Science 76 (2): 78-86, 1976.

TABLE E-4
MAMMALS KNOWN TO EXIST IN THE WEST HARBOR AREA ^{1/}

Common Name	Scientific Name	Status of the Population in West Harbor and Adjacent Locale
Opossum	<u>Didelphis marsupialis virginiana</u>	Stable
Cottontail Rabbit	<u>Sylvilagus floridanus mearnsii</u>	Decreasing
Woodchuck	<u>Marmota marmota monax</u>	Stable
Fox Squirrel	<u>Sciurus niger rufiventer</u>	Decreasing
Red Squirrel	<u>Tamiasciurus hudsonicus loquax</u>	Decreasing
Muskrat	<u>Onadatra onadatra zibethicus</u>	Decreasing
Red Fox	<u>Vulpes fulva fulva</u>	Stable
Raccoon	<u>Procyon lotor lotor</u>	Stable
Least Weasel	<u>Mustela rixosa allegheniensis</u>	Decreasing
Long-Tailed Weasel	<u>Mustela frenata novaboracensis</u>	Decreasing
Mink	<u>Mustela vison mink</u>	Decreasing
Skunk	<u>Mephitis mephitis nigra</u>	Stable
White-Tailed Deer	<u>Odocoileus virginianus</u>	Increasing
White-Footed Mouse	<u>Peromyscus leucopus</u>	Unknown
Norway Rat	<u>Rattus norvegicus</u>	Unknown

^{1/} From: Fall, Michael W., Jackson, William B. and Carpenter, Michael L.: "The Occurrence and Origin of Small Mammals on the Islands and Peninsulas of Western Lake Erie". Ohio Journal of Science 68 (2): 109-116, 1968.

Also: Information provided by the Ohio Department of Natural Resources, Division of Wildlife District Office, Findlay, Ohio.

TABLE E-5
REPTILES DOCUMENTED AS OCCURRING ON CATAWBA ISLAND ^{1/}

Common Name	Scientific Name
Ring-Necked Snake	<u>Diadophis punctatus edwardsii</u>
Blue Racer	<u>Coluber constrictor flaviventris</u>
Fox Snake	<u>Flaphe vulpina</u>
Milk Snake	<u>Lampropeltis triangulum triangulum</u>
Common Water Snake	<u>Natrix sipedon sipedon</u>
Island Water Snake	<u>Natrix sipedon insularum</u>
Dekay's Snake	<u>Storeria dekayi</u>
Common Garter Snake	<u>Thamnophis sirtalis sirtalis</u>
Timber Rattlesnake	<u>Crotalis horridus horridus</u>
Snapping Turtle	<u>Chelydra serpentina</u>
Blanding's Turtle	<u>Emys blandingii</u>
Box Turtle	<u>Terrapene carolina</u>
Painted Turtle ^{2/}	<u>Chrysemys bellii marginata</u>
Spiny Soft-Shelled Turtle	<u>Amyda Spinifera</u>
Spotted Turtle (endangered) ^{3/}	<u>Clemmys guttata</u>

1/ From: Conant, Roger: The Reptile of Ohio. University of Notre Dame Press, Notre Dame, Indiana, 1951.
 2/ Personal Observation.
 3/ Expected to occur in the project area based on knowledge of habitat requirements and range (information provided by Ohio Department of Natural Resources, Division of Wildlife, Findlay Office)

TABLE E-6
AMPHIBIANS OF THE ISLAND AREA OF LAKE ERIE ^{1/}

Common Name	Scientific Name
Mudpuppy	<u>Necturus maculosus maculosus</u>
Jefferson Salamander	<u>Ambystoma jeffersonianum</u>
Spotted Salamander	<u>Ambystoma maculatum</u>
Small-Mouthed Salamander	<u>Ambystoma texanum</u>
Eastern Tiger Salamander	<u>Ambystoma tigrinum tigrinum</u>
Red-Spotted Newt	<u>Diemictylus viridescens viridescens</u>
Red-Backed Salamander	<u>Plethodon cinereus cinereus</u>
American Toad	<u>Bufo americanus americanus</u>
Fowler's Toad	<u>Bufo woodhousei fowleri</u>
Blanchard's Cricket Frog	<u>Acris crepitans blanchardi</u>
Northern Spring Peeper	<u>Hyia crucifer crucifer</u>
Striped Chorus Frog	<u>Pseudacris triseriata triseriata</u>
Bullfrog	<u>Rana catesbeiana</u>
Northern Leopard Frog	<u>Rana pipiens pipiens</u>

1/ From: Langlois, Thomas H.: "Amphibians and Reptiles of the Erie Islands". Ohio Journal of Science 64 (1): 11-25, 1964.

TABLE E-7
COMPARISON OF WEST HARBOR WATER QUALITY DATA
WITH OHIO E.P.A. STANDARDS

Chemical Parameter	Units	Ohio Standard*	Measured Concentration	
			Harbor	Lake
Sulfates	mg/l	35 (mo. av.) 50 (max. day)	34	21
Chloride	mg/l	25 (mo. av.) 30 (max. day)	17	15
Silica (total as SiO ₂)	mg/l		≤ 0.2	≤ 0.2
Nitrate + Nitrite (as N)	mg/l		0.34	0.28
Ammonia (as N)	mg/l	1.5	0.25	0.12
Total Kjeldahl Nitrogen	mg/l		0.64	0.53
Phosphorus (total)	mg/l	0.025	0.05	0.02
Total Organic Carbon	mg/l		4	4
Mercury (total)	μg/l	0.3	≤ 0.1	≤ 0.1
Arsenic (total)	μg/l	1	≤ 2	≤ 2
Calcium (total)	mg/l		43.6	32.3
Magnesium (total)	mg/l		10.0	8.6
Sodium (total)	mg/l		10.3	9.8
Silver (total)	μg/l	1	≤ 13	≤ 13
Aluminum (total)	μg/l		≤ 100	≤ 100
Boron (total)	μg/l		21	11
Barium (total)	μg/l	1	11	6
Beryllium (total)	μg/l		≤ 1	≤ 1
Cadmium (total)	μg/l	5	≤ 10	≤ 10

*Ohio E.P.A. standard for Lake Erie, western basin, nearshore.

TABLE E-7

COMPARISON OF WEST HARBOR WATER QUALITY DATA
WITH OHIO E.P.A. STANDARDS

Chemical Parameter	Units	Ohio Standard*	Measured Concentration	
			Harbor	Lake
Cobalt (total)	$\mu\text{g}/\text{l}$		< 5	< 5
Chromium (total)	$\mu\text{g}/\text{l}$	50	< 12	< 12
Copper (total)	$\mu\text{g}/\text{l}$	10	7	5
Iron (total)	$\mu\text{g}/\text{l}$	300	345	102
Manganese (total)	$\mu\text{g}/\text{l}$	50	15	< 5
Molybdenum (total)	$\mu\text{g}/\text{l}$		< 5	< 5
Nickel (total)	$\mu\text{g}/\text{l}$	50	< 25	< 25
Lead (total)	$\mu\text{g}/\text{l}$	50	< 30	< 30
Tin (total)	$\mu\text{g}/\text{l}$		< 50	< 50
Titanium (total)	$\mu\text{g}/\text{l}$		8	9
Vanadium (total)	$\mu\text{g}/\text{l}$		< 100	< 100
Yttrium (total)	$\mu\text{g}/\text{l}$		< 5	< 5
Zinc (total)	$\mu\text{g}/\text{l}$	50	76	20

*Ohio E.P.A. standard for Lake Erie, western basin, nearshore.

TABLE E - 8
 COMPARISON OF WEST HARBOR BULK SEDIMENT DATA
 WITH U.S.E.P.A. STANDARDS 1/

Parameter	U.S.E.P.A. Classification			Measured Concentration by Sampling Station						
	Non-Polluted	Moderately Polluted	Heavily Polluted	1	2	3	4	5	6	7
Total Volatile Solids (%)	<5	5-8	>8	16.7	9.8	9.1	2.7	10.3	0.7	0.2
Chemical Oxygen Demand	<40,000	40,000-80,000	>80,000	102,500	50,800	42,400	16,700	61,900	1,560	5,330
Total Kjeldahl Nitrogen	<1,000	1,000-2,000	>2,000	1,070	1,250	1,864	412	491	25	32
Oil and Grease	<1,000	1,000-2,000	>2,000	110	74	102	35	160	70	55
Lead	<40	40-60	>60	52.5	32.0	42.8	47.6	33.3	<1.0	<1.0
Zinc	<90	90-200	>200	12.01	23.44	26.30	6.98	12.65	7.26	6.79
Mercury	<1.0	—	≥ 1.0	0.200	0.246	0.204	0.262	0.228	0.100	0.060
Total PCB's	1.0-10.0 classification determined on case-by-case basis			≥ 10.0	0.035	0.013	0.031	0.010	0.032	0.017
Ammonia	<75	75-200	>200	51	77	25	61	48	1.0	0.6

1/ All concentrations in mg/kg dry weight unless otherwise noted.

TABLE E-8
COMPARISON OF WEST HARBOR BULK DATA
WITH U.S.E.P.A. SEDIMENT 1/ (Cont.)

Parameter	U.S.E.P.A. Classification			Measured Concentration by Sampling Station				7	
	Non-Polluted	Moderately Polluted	Heavily Polluted	1	2	3	4		
Phosphorus	≤ 420	420-650	> 650	2,371	1,620	2,445	1,913	2,612	2,623
Manganese	≤ 300	300-500	> 500	142	130	53	63	68	60
Arsenic	≤ 3	3-8	> 8	0.01	0.01	< 0.01	0.01	< 0.01	< 0.01
Cadmium	Lower limits not established			1.98	2.22	3.22	1.43	3.06	2.45
Chromium	≤ 25	25-75	> 75	8.91	5.10	7.23	4.68	7.65	2.55
Copper	≤ 25	25-50	> 50	5.0	9.0	1.5	1.5	3.0	< 0.01
Iron	≤ 17,000	17,000-25,000	> 25,000	1,630	2,852	1,222	1,296	1,148	1,963
Nickel	≤ 20	20-50	> 50	19.42	23.43	12.01	21.17	10.33	18.32

1/ All concentrations in mg/kg dry weight unless otherwise noted.

TABLE E- 9
RESULTS OF STANDARD ELUTRIATE ANALYSES FOR WEST HARBOR SEDIMENT SAMPLES¹

Parameter	Test Blank	Concentration by Sampling Station						
		1	2	3	4	5	6	7
Total Volatile Solids	< 1.0	32	41	45	37	39	10	12
Chemical Oxygen Demand	0.8	7.5	14.9	14.9	3.7	7.5	7.5	3.7
Total Kjeldahl Nitrogen	0.05	1.00	1.43	1.52	1.76	1.03	0.32	0.81
Oil and Grease	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lead	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	0.016	0.006
Mercury	< 0.0001	0.0004	0.0005	0.0005	0.0002	0.0004	0.0001	0.0001
Total PCB's and Pesticides		ALL SAMPLES REGISTERED BELOW DETECTABLE LIMITS						
Ammonia	0.05	0.42	1.1	0.75	2.41	0.65	0.55	0.15
Phosphorus	0.01	0.018	0.118	0.032	0.140	0.022	0.044	0.050
Manganese	< 0.001	< 0.001	0.005	0.002	< 0.001	< 0.001	< 0.001	0.002
Arsenic	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cadmium	< 0.001	0.005	< 0.001	0.005	< 0.001	0.001	0.002	0.002
Chromium	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Copper	< 0.001	< 0.001	0.003	0.003	0.003	< 0.001	< 0.001	< 0.001
Iron	0.01	0.13	0.057	0.089	0.13	0.089	0.046	0.013
Nickel	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

¹ All concentrations are in mg/l based on a 1:4 sediment: water ratio.

TABLE E-10
1970 EMPLOYMENT IN OTTAWA COUNTY BY COMMERCIAL SECTOR ^{1/}

Type of Commercial Activity	Employment	Percent of Total County Employment
Agricultural, Forestry, Fishing and Mining	900	6.1
Manufacturing	5,250	35.8
Contract Construction, Transportation, Communications, Public Utilities and Wholesale	1,850	12.6
Services	2,300	16.0
Retail Trade, Finance, Insurance, Real Estate, Government	4,300	29.5
TOTAL	14,600	100.0

^{1/} From: Ottawa County Regional Planning Commission: Ottawa County Comprehensive Planning Program, Volume 1 - Population and Economic Study. Prepared by Finkbeiner, Pettis & Strout, Ltd., Toledo, Ohio, 1971.

TABLE E-11
MAJOR PARKS IN THE WEST HARBOR VICINITY 1/

Park Name	Location	Acreage	Major Facilities or Attractions
Catawba Island State Park	N.W. tip of Catawba Island, 2 mi. N.W. of West Harbor	8	Boat launch; picnicking
East Harbor State Park	Danbury Township on Lake Erie, 1.5 mi. S.W. of West Harbor	1,613	Excellent swimming beach; public boat launch; marinas
South Bass Island State Park	In Lake Erie 7 mi. N. of West Harbor	32	Glacial grooves; nearby Perry's National Monument and Crystal Cave (a natural cave covered with strontium sulfate crystals)
Kelley's Island State Park	In Lake Erie 7 mi. N.E. of West Harbor	590	Picnicking; nearby glacial grooves and Inscription Rock (a boulder with pictographs carved by prehistoric Indians)
Lakeside	On eastern end of Marblehead Peninsula, 4 mi. S.E. of West Harbor	10	Camping; winterized lodge

1/ From: Melvin, Ruth W.: A Guide to Ohio Outdoor Education Areas. Prepared for the Ohio Department of Natural Resources and the Ohio Academy of Science, 1974.

TABLE E-12

NATIONAL REGISTER OF HISTORIC PLACES
PROPERTIES IN THE VICINITY OF THE
MARBLEHEAD PENINSULA ^{1/}

Site	Location	Distance From West Harbor (Miles)
Jay Cooke House	Gibraltar Island, Put-In-Bay	6.5 miles north
Marblehead Lighthouse	Marblehead	6 miles southeast
Perry's Victory and International Peace Memorial	Put-In-Bay, South Bass Island	6.5 miles north
Mineyatha-on-the-Bay, War of 1812 Battle Site	East Bay Shore Road south of Marblehead on Sandusky Bay	6 miles southeast
Johnson Island Civil War Prison and Fort Site	Johnson Island in Sandusky Bay	7 miles southeast
Ottawa County Courthouse	Port Clinton	7.5 miles southeast
Inselruhe	South Bass Island	6 miles north
Inscription Rock	Kelley's Island	6 miles northeast
Kelley's Island South Shore District	Kelley's Island	6 miles northeast

^{1/} From: U.S. Department of the Interior, National Park Service: "National Register of Historic Places". Federal Register, Tuesday, February 1, 1977.

APPENDIX F
GLOSSARY

GLOSSARY

aquatic	pertaining to the water environment.
barrier beach	an embankment of sand, gravel, or other unconsolidated material which lies essentially parallel to the shoreline above water.
benthos	organisms living on or in the bottom materials of a water body.
bulk sediment analysis	the determination of the concentrations of pollutants in a sediment sample by various laboratory techniques.
carrying capacity	the upper limit in the size of a given faunal population as determined by constraints imposed by the local environment.
community	the combination of all plant or animal populations in a given area.
dolomite	a sedimentary rock composed predominantly of calcium and magnesium carbonates.
eutrophic	a stage in the natural aging of a water body which is characterized by high biological productivity due to the presence of large amounts of nutrients and organic matter.
fauna	the animals of a given region.
flora	the plants of a given region.
littoral transport	the movement of sand and other unconsolidated materials by waves and currents along the shoreline of a water body.
macroinvertebrate	an animal not possessing a backbone which is sufficiently large in size to be seen with the unaided eye.
mesotrophic	an intermediate stage in the natural aging of a water body which precedes the eutrophic stage.
population	the total number of individuals of a species inhabiting a given area.

GLOSSARY (cont'd.)

standard elutriate test	a laboratory technique used to indicate the potential ease with which pollutants associated with dredged materials may be released into solution in a water body during open-water disposal operations.
substrate	any solid or semi-solid material the surface or subsurface of which is used as habitat by organisms.
terrestrial	pertaining to the land environment.
turbidity	suspended particles of inorganic and organic matter in a water body.

APPENDIX G

**SECTION 404
EVALUATION**

MAR 30 1979

SECTION 404 EVALUATION
RECREATIONAL NAVIGATION IMPROVEMENTS
WEST HARBOR, OHIO

1. INTRODUCTION

1.01 West Harbor is the largest and busiest recreational boat harbor in Ohio. However, the natural channel has become so shallow from sand shoals that only the very smallest recreational craft can navigate through without threat of running aground. Many boaters are forced to use a narrow exposed private channel. During storm periods, entrance through either channel is very hazardous.

1.02 The plan to alleviate the navigational problems consists of two arrowhead breakwaters with an aggregate length of 2,695 feet extending northeasterly in Lake Erie on either side of the West Harbor natural channel entrance. A channel 100 feet wide and 10 feet deep would be dredged between the breakwaters to the natural harbor entrance. A channel 80 feet wide and 8 feet deep would be dredged from the entrance to the middle of the harbor and then divide into two connecting channels. Clean sand dredged from the harbor entrance would be used for beach nourishment at East Harbor State Park. Silty material dredged from within the harbor is unsuitable for open water disposal and would be placed into three disposal sites. Some of the material would be tilled into two adjacent agricultural fields, and the remainder would be placed into a confined site at East Harbor State Park.

1.03 The project was authorized by Section 301, P.L. 89-298, of the River and Harbor Act of 27 October 1965 as described in House Document No. 245, 88th Congress, 2nd Session.

1.04 Section 404 of the Federal Water Pollution Control Act of 1972 (P.L. 92-500) requires that the Corps of Engineers apply to its own projects the same criteria used in evaluating projects requiring a dredge or fill permit. These criteria include evaluation under 40 CFR 230, an Environmental Protection Agency Regulation, and an adequate opportunity for public review and comment on the projects. Title 40 CFR 230 requires that any proposed plan involving placement of fill material into navigable waters must take into account the effect this action will have on wetlands, water quality, benthic organisms, fisheries and shellfish beds (including spawning and breeding areas), wildlife, and recreation. The effects of the proposed project on these resources have been addressed in Section 3 below, in the Final Environmental Statement and in Appendix 2.

2. PUBLIC NOTICE AND COORDINATION

2.01 A public notice for the proposed project was prepared in conformance with Title 33 U.S. Code of Federal Regulations 209.145 and was issued on 28 October 1977 (Appendix 1). No comments were received in response to the notice.

A public hearing was held on 21 Nov 1977 to discuss the proposed project and to allow public comment on the proposed fill in Lake Erie (P.L. 92-500). The primary concern expressed at the hearing involved the timetable for construction. There were no comments on the impacts of the proposed fill. The Environmental Protection Agency in commenting on the Draft Environmental Statement expressed concern that unregulated secondary development could degrade the water quality at West Harbor. In response, it was noted that any new development would be subject to the zoning regulations of the County Planning Commission. All future development would be subject to Ohio Environmental Protection Agency guidelines which limit development that could degrade the water quality.

3. EVALUATION OF IMPACTS

3.01 Effects on Wetlands: The project involves open water and upland areas. There are no anticipated impacts to wetland areas.

3.02 Effects on Submerged Vegetation: There are no known rooted aquatic plants in the construction zones. Wave action and an unstable bottom limits plant growth.

3.03 Effects on Water Quality: Construction of the breakwaters along with channel dredging would cause turbidity in the immediate project area. The deeper channel however, would reduce turbidity due to prop wash.

3.04 Effects on Shellfish: There are no commercial shellfish beds in the area.

3.06 Effects on Fishery Resources: No spawning areas are known at the project site. Carp spawn in the shallow shoreline areas of West Harbor, but should not be affected by channel dredging. The breakwater, reinforced with riprap, would create a habitat conducive to fish spawning and feeding.

3.07 Effects on Wildlife: No effects on wildlife are anticipated. Disposal of the fertile silt at the East Harbor State Park site would enrich the sandy soil. A rapid luxuriant growth of vegetation is expected. The wildlife potential of the area would be enhanced.

3.08 Effects on Recreation: The project would greatly benefit recreational boating at West Harbor. Beach nourishment at East Harbor State Park would directly benefit recreational use of the beach.

3.09 Effect on Rare or Endangered Species: There are no anticipated impacts to any rare or endangered species.

3.10 Effect on Historic and/or Archeological Resources: There are no National Historic sites in the project area. An archeological reconnaissance was conducted at the agricultural upland disposal sites in the summer of 1978.

3.11 Effects on Municipal Water Supplies: No disposal sites are near a public water supply. However, the northwest breakwater is near the water intake at Harbor Island. No adverse impacts to the water at the intake are anticipated. A regional water supply system is expected to replace the intake structure prior to project construction.

4. ALTERNATIVES: Alternative courses of action including no action were evaluated. The proposed project was selected because of social, economic, engineering and environmental factors. Wetland considerations were of major importance in the selection of the upland disposal sites.

5. CURRENT PROJECT STATUS: Construction is expected to begin in 1980.

6. SECTION 404(b) DETERMINATIONS AND FINDINGS

6.01 Reference. 40 CFR 230

6.02 Determinations.

a. An ecological evaluation has been made following the evaluation guidance in 40 CFR 230.4, in conjunction with the evaluation considerations in 40 CFR 230.5. (40 CFR 230.3(d)).

b. Appropriate measures have been identified and incorporated in the proposed plan to minimize adverse effects on the aquatic environment as a result of the discharge. (40 CFR 230.3(d)(1)).

c. Consideration has been given to the need for the proposed activity, the availability of alternate sites and methods of disposal that are less damaging to the environment, and such water quality standards as are appropriate and applicable by law. (40 CFR 230.5).

d. Wetlands 40 CFR 230.5(b)(8)). Dredged Material. The site selected is the least environmentally damaging alternative.

6.03 Findings. The discharge site for the West Harbor project has been specified through the application of the 404(b)(1) Guidelines.

Daniel D. Ludwig
DANIEL D. LUDWIG
Colonel, Corps of Engineers
District Engineer

Date of Signature: 23 March 1978

MAP 30 1979

APPENDIX 1



DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

NCEED

PUBLIC NOTICE

HARBOR NAVIGATION AT WEST HARBOR, OHIO

1. The 88th Congress, 2nd Session, in House Document No. 245, authorized a Harbor Improvement Project for West Harbor, Ohio. A Phase I General Design Memorandum to reaffirm or reformulate that authorized plan was completed by the Corps of Engineers in August 1977. The proposed project consists of the natural channel dredged to 10 feet in Lake Erie and 8 feet in West Harbor and two breakwaters, one of 1,630 feet and one of 1,065 feet in length.
2. Phase I Study outputs, including the General Design Memorandum and the Environmental Statement (EIS), are being reviewed under the following laws: Federal Water Pollution Control Act, Coastal Zone Management Act of 1972, National Environmental Policy Act of 1969, Fish and Wildlife Act of 1956, Fish and Wildlife Coordination Act, Endangered Species Act of 1973, and the National Historic Preservation Act of 1966.
3. The proposed plan (see drawing) includes a lake channel of 100 feet wide, 10 feet deep and 1800 feet long. The entrance channel and inner harbor channel combine for a total length of 10,930 feet; both are 8 feet deep and 80 feet wide. Dredge material removed from the lake channel and the entrance channel would be used to nourish beaches located south from the entrance channel. Dredged material from the inner harbor would be placed in a diked disposal area currently designated in Middle Harbor.
4. The Phase I and Environmental Impact Statement for West Harbor are coordinated with the following agencies:
 - a. Federal:
 - (1) U.S. Department of Interior: Bureau of Outdoor Recreation
Fish and Wildlife Service
National Park Service
 - (2) Environmental Protection Agency
 - (3) Great Lakes Basin Commission
 - (4) U.S. Coast Guard
 - (5) U.S. Department of Commerce
 - (6) Great Lakes Commission
 - (7) U.S. Department of Agriculture - Soil Conservation Service

b. State:

- (1) Office of the Governor (State Clearinghouse)
- (2) Ohio Department of Natural Resources
- (3) Ohio Environmental Protection Agency
- (4) Ohio Department of Transportation
- (5) State Historical Preservation Office
- (6) Ohio Historical Society - Division of Archeology

c. Local:

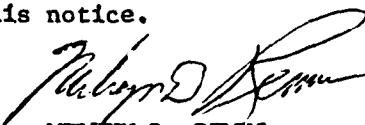
- (1) Ottawa County Offices
- (2) League of Women Voters
- (3) Lake Erie Advisory Committee
- (4) West Harbor Yacht Club
- (5) Catawba Island Chamber of Commerce
- (6) Lake Erie Basin Committee
- (7) League of Ohio Sportsmen
- (8) Northwestern Ohio National Resources Council
- (9) Wolf Creek Sportsmen Association, Inc.

In addition, a formal public meeting will be held on 21 November 1977. All interested agencies as well as private citizens will be encouraged to present their concerns and ideas on the proposed plan at that meeting.

5. Any questions relevant to the stipulations contained in Section 404 of the Federal Water Pollution Control Act (FWPCA) may be handled at this meeting or procedures outlined below may be used. The Section 404 evaluation deals with the potential impact of a project on natural aquatic resources as a result of dredge material disposal.

6. Any person who has an interest which may be affected by the dredging and placement of dredge material in the West Harbor area, as previously stated, may request a public hearing. The request must be submitted in writing to the District Engineer within thirty (30) days of the date of this notice and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by this activity.

7. This notice is being published in conformance with 33 US Code of Federal Regulations 209.145. Any interested parties desiring to express their views concerning the proposed dredging may do so by filing their comments in writing with this office not later than 4:30 P.M., 30 days from the date of issuance of this notice.



1 Incl
Drwg of proposed plan

MELVYN D. REMUS
Colonel, Corps of Engineers
District Engineer

NOTICE TO POSTMASTERS:

It is requested that the above notice be conspicuously and continuously posted for 30 days from the date of issuance.



DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

ANNOUNCEMENT! of PUBLIC MEETING

PHASE I GENERAL DESIGN MEMORANDUM STUDY
FOR RECREATIONAL BOATING
AT
WEST HARBOR (OTTAWA COUNTY), OHIO

WHAT FOR?

To present specific details on the best alternatives to meet the recreational boating needs of the area.

WHO SHOULD ATTEND?

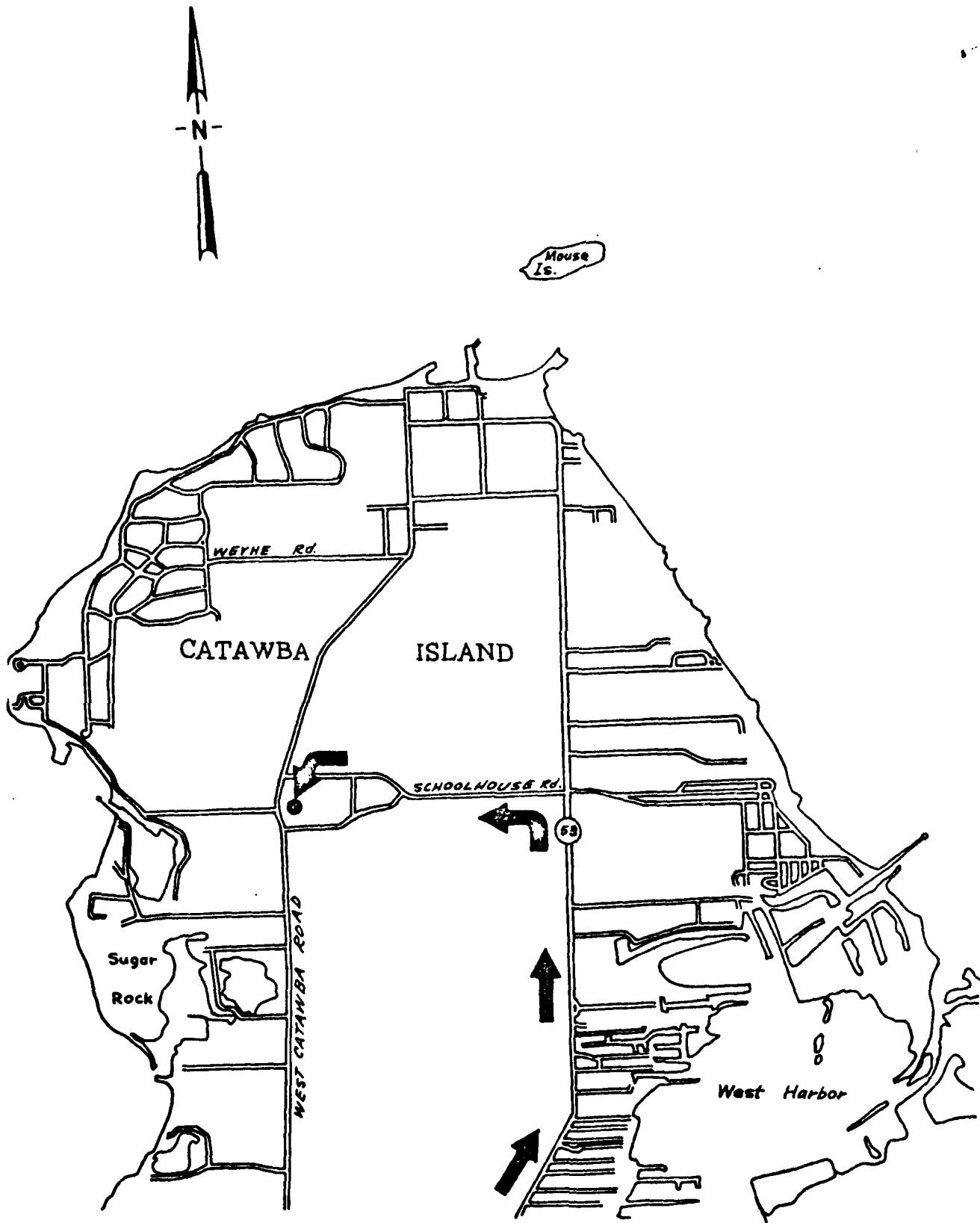
Anyone interested in shallow draft navigation, and water resources development at West Harbor, Ohio.

WHERE AND WHEN?

Catawba Island Township Community Hall
Ottawa County, Ohio
Monday, 21 November 1977
7:30 P.M.

For additional information contact
Mr. Dale Monteith, Project Manager at (313)226-6755.
See map for directions on reverse side.

"THE CORPS CARES"



22 DEC 1977

DIGEST OF PROCEEDINGS OF THE
PUBLIC MEETING FOR THE PHASE I GENERAL
DESIGN MEMORANDUM STUDY FOR RECREATIONAL BOATING
AT WEST HARBOR (OTTAWA COUNTY), OHIO

1. GENERAL

The public meeting was held on 21 November 1977 by the Deputy District Engineer, Detroit District, Corps of Engineers. The meeting was held at the Catawba Island Township Community Hall, Ottawa County, Ohio. Approximately 50 people were present.

2. Deputy District Engineer, LTC Richard D. Slife, opened the meeting by expressing thanks to Catawba Township for the use of their facilities. He then introduced the State of Ohio and Corps of Engineers personnel in attendance.

3. LTC Slife presented an overview of the project, starting with the history, commenting that the project started in 1958 to determine the merits of providing shallow draft recreational boating in the West Harbor area. He outlined the configuration of the harbor, the shoaling conditions and the need for modification based on the harbor's high recreational use (over 2,600 recreational boats occupy West Harbor). LTC Slife said the project for navigation was recommended in a survey report, and this report was printed in House Document 88-245. In 1965, the West Harbor project was authorized by the Rivers and Harbors Act. However, further funding was not provided until October 1976. Because of the length of time between the initial survey report and the current effort, Congress required a second study to reaffirm the original design and also to update the environmental data. He referenced the public hearing held on February 17, 1977 which was to gain local input into the plan, and then focused on the key environmental issue, which is where to put the dredged material that has been classified as unsuitable for open lake disposal. LTC Slife then turned the meeting over to Mr. Dale Monteith, Project Manager, to address the various alternatives that have been developed.

4. Mr. Monteith gave a slide presentation to show the extensive development at West Harbor. He said plans were developed for various alternatives based on discussions held at the February meeting. Mr. Monteith then explained the alternatives starting with the Natural Channel Plan which follows the original alignment proposed in the House Document developed in 1965. This plan contains a channel along the natural outlet, but provides for an extension of 1,400 feet within

West Harbor. There would be two breakwaters at the outlet and the eastern breakwater would extend to shore, allowing for sport fishing. Total first cost would be approximately \$5.83 million dollars with a benefit cost ratio of 4.23 to 1. It appears to be the plan preferred by the boating interests of the area.

5. Mr. Monteith then explained a second channel alignment that was investigated in the Phase I Study. It consisted of a straight line cut through the Harbor Island area again meeting in the center portion of the harbor with identical access arms both heading north and south within the harbor. It again would have two breakwaters. The easterly one would be connected to shore and the estimated total first cost is slightly higher at 5.86 million dollars. It has a benefit cost ratio of 4.2 to 1. It would entail going through an area that's considered to have some aquatic habitat, such that it would create some environmental problems.

6. A third channel alignment that was investigated was to improve the outlet through the existing Gem Beach Channel in lieu of improvements along the natural outlet. The plan would not have sport fishing facilities provided due to the local development within both areas immediately surrounding the Gem Beach Harbor where breakwaters would be located. The cost of this plan is slightly less at \$5,125,000 with the benefit cost ratio being approximately 4.6 to 1. It is an alignment that is preferred by the U.S. Fish and Wildlife Service.

7. The plan the Corps feels most adequately meets the needs of the public in the West Harbor area is the first alternative presented. Several potential sites for placement of that dredged material have been suggested. The Corps has met with the Ohio Department of Natural Resources, U.S. Fish and Wildlife Service, and the U.S. Environmental Protection Agency to evaluate potential sites. Sites which appear to be acceptable for placement of inner harbor material consist of a 36 acre area of East Harbor State Park and two farm areas of 42 acres and 55 acres near the southeast corner of West Harbor. Material to be dredged from the outer harbor area would be distributed along the East Harbor State Park shoreline for beach nourishment.

8. LTC Slife explained that the Corps would seek a local sponsor to provide the items of local cooperation. The cost breakdown between the Federal Government and the local sponsor is equally shared for the general navigation facilities. The local sponsor would provide the rights-of-way, holding the Federal Government harmless from damages. A public body

would be needed to regulate the growth of the harbor, provide public access, construct and maintain channels from marinas to the Federal channels, contribute half the cost of the structures associated with sport fishing, maintain facilities developed for sport fishing and, if needed, provide mitigating measures to prevent degraded water quality at the Harbor Island water intake.

9. STATEMENTS

Statements presented during the session are summarized in the following paragraphs:

a. Norville L. Hall, Chief of the Division of Watercraft of the Ohio Department of Natural Resources, made the following statement on behalf of the Ohio Department of Natural Resources, a prospective non-Federal sponsor of the proposed harbor improvement project. Mr. Hall stated the need for the project, and expressed hope that a disposal area would be agreed upon for the dredge spoil. He also stated concern regarding the possible increased cost associated with placing the spoil in areas considered to have the least environmental impact. Funds are limited for the non-Federal share of the project and any great increase in cost would place the project beyond the ability of the State of Ohio to insure non-Federal funds. He also stated that the Ottawa County Commissioners appeared to be a public body that presently exists that is empowered to regulate the use, growth, and free development of all lands within the county. He also expressed a need for clarification by the Corps of Engineers to specifically identify which areas are considered to be "to principal docks and in berthing areas" for maintenance of channel depths.

b. Mr. Lewis Rankin, an attorney from Columbus, Ohio, and the Legislative Officer of the Columbus Power Squadrons stated the Power Squadrons concern with the disposal of the dredged material. He would like to see an agreement soon as to where to put the dredged material so that the project can get started.

c. Mr. Tom Corogin, attorney for the Harbor Park Marina, stated that the Harbor Park Marina is developing land in the area and would like to have the dredged material from the project used as land fill.

10. DISCUSSION

a. Mr. Dwight Buchholtz asked why the study was taking so long. LTC Slife explained the procedure the Corps must take for each study before construction can begin.

b. Mr. Floyd McCullough, owner of the West Harbor Lagoons Mobile Home Park and a marine contractor, asked if the dredged material being placed on the State park land would be an enlargement of the one that was made back approximately 15 years ago. Mr. Monteith said the dredged material would be placed on the area where previous material has been placed.

c. Mr. Thomas from Worthington, Ohio, expressed his concern that the local authorities would not be able to appropriate the money for their share of the project. Mr. Hall from the Ohio Department of Natural Resources stated that \$1.5 million has been appropriated for the project.

d. Mr. Lewis Rankin asked if there was a problem with getting a local sponsor for the project. LTC Slife said that the State had indicated that this is a high priority project; however, local sponsorship could still be a problem. Mr. Rankin then expressed his concern with where the dredged material would be placed.

e. Mr. Don Orrick from Worthington, Ohio, asked whether the Corps must abide by what the Fish and Wildlife and Environmental Protection Agency stipulate. LTC Slife said that the Corps is more or less mandated by law to abide by their determinations.

f. Mr. Dwight Buchholtz said that at the February meeting, the County Commissioners tried to wash their hands of the channel and the upkeep of it. LTC Slife said that the Corps would explore the County Commissioners' position when we have an opportunity to meet with them and the State in the near future.

g. Mr. Charlie Grant, Harbor Island, thought that the north wing on the breakwater should be connected to the shore. He said the channel would fill in right at that area if it were not connected. Mr. Monteith said the basic movement of the sand through that area is from east to west, and that it is felt that the breakwater is not needed to be connected to shore.

h. Mr. John Moore, Catawba, asked if the letter that was sent to the County Commissioners had any dollar figures as

to what it would cost the local sponsor. Mr. Monteith said that the letter included cost figures as presented in the Draft Phase I General Design Memorandum Report. Mr. Moore was concerned as to how much the local sponsors would have to contribute to the project. Mr. Monteith stated that final figures would not be available until the time of construction.

i. Mr. Dwight Buchholtz asked what happens if the local sponsor does not have the money in one lump-sum. LTC Slife said that if the local sponsor signs the assurances, it is on the basis that they have available funds which would be supplied when required.

j. Mr. Bill Dauterman, Fostoria, Ohio, asked if the State was still reluctant to provide interim dredging with the Federal Government for the West Harbor channel to keep it open for boaters. Mr. Hall said that since Congress has not yet passed amendments to Section 221 of the 1970 Rivers and Harbors Act, which requires that States commit themselves to continuing maintenance of emergency projects until a permanent project is completed, the State would be unable to legally cooperate with the Corps in getting the dredging of the channel done.

k. Mr. Thomas Hetzel, Catawba, Ohio, asked about the opening of the outermost breakwater entrance and its relationship to the 100 foot wide channel. Mr. Monteith said the proposed width between the breakwaters at their outer ends is 200 feet. The channel that would go between the two breakwaters has a bottom width of 100 feet. There will be some side slopes involved, but essentially it would not extend from point to point of the breakwaters.

11. CONCLUSIONS

LTC Slife concluded the meeting by stating his appreciation to all who attended the meeting and that any other comments could be addressed to him by letter.

APPENDIX 2

**REFERENCE LIST FOR SECTION 404 CERTIFICATION
PHASE I GENERAL DESIGN MEMORANDA
RECREATIONAL NAVIGATION IMPROVEMENTS AT
WEST HARBOR, OHIO**

<u>Factors Considered</u>	<u>Reference (FEIS-para)</u>	<u>Remarks</u>
1. Factors to be Considered		
A. Basic considerations		
(1) Need for activity	1.03	The need for the activity is based on the desires of the local community and the Benefit/cost ratio as discussed in the FEIS and the Phase I GDM.
(2) Availability of alternate sites	6.01 - 6.10	Alternatives are discussed in both documents.
(3) Methods of disposal less damaging to the environment	6.20, 4.40	The method selected was based on engineering, economic, and environmental considerations.
(4) Water quality standards applicable by law	4.03, 4.32	No water quality problems are anticipated.
B. Cumulative Impacts - The site will be evaluated with recognition that it is part of a complete and interrelated ecosystem.	4.01 - 4.22	Cumulative effects were assessed in general throughout Section 4 as well as Section 7 of the FEIS.
C. Alternatives shall be considered in light of the following:		
(1) Avoid significant disruption of the chemical, physical, and biological integrity of the aquatic ecosystem.	4.01 4.02 4.03 4.04 4.07 - 4.22	Disruptions to the aquatic ecosystem would be primarily temporary during construction.
(2) Avoid disruption of the food chain, including alterations or decrease in diversity.	4.07 - 4.11	Minimal impacts on the food chain are anticipated. Species diversity would tend to increase with the rubble mound rip-rap on the breakwaters.

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WEST HARBOR, OHIO

<u>Factors Considered</u>	<u>Reference</u>	<u>Remarks</u>
(3) Avoid inhibiting the movement of fauna, especially movement to and from feeding, spawning, breeding and nursery areas.	4.09 4.10 4.14 4.15	Minimal impact on fauna is anticipated. There are potential benefits to aquatic species.
(4) Consider whether or not the discharge activities might destroy or isolate areas which serve the function of retaining natural high waters or flood waters.	N/A	The disposal sites are in dry upland areas. No wetlands are involved.
(5) Avoid destruction of wetland areas which provide a natural buffer area for the wave action of hurricanes and storms.	N/A	No wetlands are involved.
(6) Minimize, where practicable, the discharge of material which will resuspend in the water column, contributing to turbidity.	4.03 4.11 4.40 5.04	Turbidity would be associated with construction activities.
(7) Avoid destruction of wetlands which provide natural purification and nutrient removal from agricultural and urban runoff.	N/A	No wetlands would be involved in the project.
D. Recreation Activities, including water contact sports, fishing, hunting, and enjoyment of natural values. Factors to be considered include:		

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WEST HARBOR, OHIO

<u>Factors Considered</u>	<u>Reference</u>	<u>Remarks</u>
(1) Minimize any increase in amount and duration of turbidity which would reduce the numbers and diversity of fish or cause an aesthetically displeasing change in the color, taste, or odor of the water.	4.03 5.04	Only temporary turbidity during construction is anticipated.
(2) Resuspension and transfer of nutrients and micro-nutrients in dredged or fill material should be minimized in order to prevent eutrophication, degradation of aesthetic values, and impairment of recreational uses.	4.03 5.04	Disposal of the silty material would be in upland sites. The fertile material would enrich, and enhance productivity at these sites.

E. Fisheries. Considerations include:

(1) Fish spawning and nursery areas should be maintained in a natural state and be undisturbed.	4.09 4.10	Minimal effect, possibly beneficial.
(2) Dredging and disposal operations should be scheduled to avoid interference with fish spawning cycles and to minimize interference with migration patterns and routes.	4.11 4.39	Construction would be timed to minimize the impacts on fish spawning.
(3) Consideration shall be given to preservation of submerged and emergent vegetation.	4.13 6.13	No significant submerged or emergent vegetation involved.

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RECREATIONAL NAVIGATION IMPROVEMENTS AT
WEST HARBOR, OHIO

<u>Factors Considered</u>	<u>Reference</u>	<u>Remarks</u>
F. Wildlife. Disposal sites will be designated so as to minimize the impact on habitat, the food chain, and community structures of wildlife.	4.37 6.18 6.19	The upland disposal sites have little vegetation. The fertile material would be a benefit to the upland community. Disposal of sand along the beach would have little or no impact on the habitat.
G. Sites should be in areas where benthic life is minimal.	4.07 4.35 4.37	The shoreline area for beach nourishment has an unstable bottom; sampling in the vicinity indicated minimal benthic life.
H. Times of dumping should be chosen to avoid interference with the seasonal reproductive and migratory cycles of aquatic life in the disposal area.	4.39 4.40	Only the beach nourishment site is in-water.
I. The type of material involved and the environmental characteristics of the disposal site should make either maximum or minimum dispersion desirable.	4.03 6.10	Minimum turbidity would accompany sand deposition along the beach.
J. Appropriate monitoring conditions may be specified, where necessary, to detect perturbation of water quality conditions or other environmental damage.	N/A	Project details do not indicate any need for monitoring.
2. <u>Special Factors to be Considered</u>		
A. Discharge of dredged or fill material may be allowed unless it is determined that:		

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RECREATIONAL NAVIGATION IMPROVEMENTS AT
WEST HARBOR, OHIO

<u>Factors Considered</u>	<u>Reference</u>	<u>Remarks</u>
(1) There is no significant need for the discharge and that it is not in the public interest.	1.01 1.03 1.04	The project authorization, B/C ratio, and statement of findings demonstrate the need and the public interest.
(2) There are reasonable alternative sites or methods of disposal which produce less adverse environmental impacts.	6.10-6.19	Alternatives were fully discussed. No reasonable alternative will produce less adverse effects.
B. No disposal site will be designated in the proximity of a public water supply intake. The Regional Administrator or the District Engineer will determine the acceptable location of the disposal site in such cases.	N/A	No disposal sites are in the vicinity of a public water supply. The northwest breakwater is near the water intake for Harbor Island. This is discussed in paragraphs 4.29, 4.30, 4.31, 4.38.
C. No materials which contains unacceptable levels of pathogenic organisms shall be discharged in areas used for sports involving physical contact with the water.	N/A	No materials containing unacceptable levels of pathogenic organisms are proposed.
D. Shellfish		
(1) Disposal sites for dredged material shall not be designated in areas of concentrated shellfish production.	N/A	No shellfish beds are known in the project area.
(2) Disposal sites should be located to minimize or prevent the movement of pollutants by currents or wave action into productive shellfish beds.	N/A	

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WEST HARBOR, OHIO

<u>Factors Considered</u>	<u>Reference</u>	<u>Remarks</u>
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(3) Banks formed by dredged or N/A fill materials should be located and oriented to prevent undesirable changes in current patterns, salinity patterns, and flushing rates which may affect shellfish.

(4) The disposal operation N/A should be scheduled to avoid interference with reproductive processes and avoid undue stress to juvenile forms of shellfish.

E. Threatened and Endangered Species - No discharge will be allowed except in accordance with the Endangered Species Act.

4.11	
4.13	
4.14	
4.18	
4.22	

Fill material will be discharged in accordance with the Endangered Species Act.

F. Wetlands

(1) Discharge or fill will N/A only be permitted when it can be demonstrated that the site selected is the least environmentally damaging alternative; provided, however, that the wetlands disposal site may be permitted if the applicant is able to demonstrate that other alternatives are not feasible and that the wetlands disposal will not have an unacceptable adverse impact on the aquatic resources. Where the discharge is part of an approved Federal, State or local program and will protect or enhance the value of the wetlands to the ecosystem, the site may be permitted.

No wetlands would be affected by the fill.

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<u>Factors Considered</u>	<u>Reference</u>	<u>Remarks</u>
(2) Discharge of fill material in wetlands shall not be permitted unless the applicant clearly demonstrates that the proposed activity on the fill site is significantly dependent on the water resources and that the fill of the site and proposed activities thereon are in the public interest. Provided, however, that the wetlands disposal may be permitted if the applicant is able to demonstrate that other alternatives are not feasible and that the wetlands disposal will not have an unacceptable adverse impact on the aquatic resources.	N/A	No wetlands would be affected by the fill.
(3) Proposed discharges of dredged or fill material in wetlands will be evaluated with respect to adverse effects on the terrain and the quality or quantity of the natural flow of water that nourish areas of the wetland not directly used for such discharges.	N/A	No wetlands would be affected by the fill.

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